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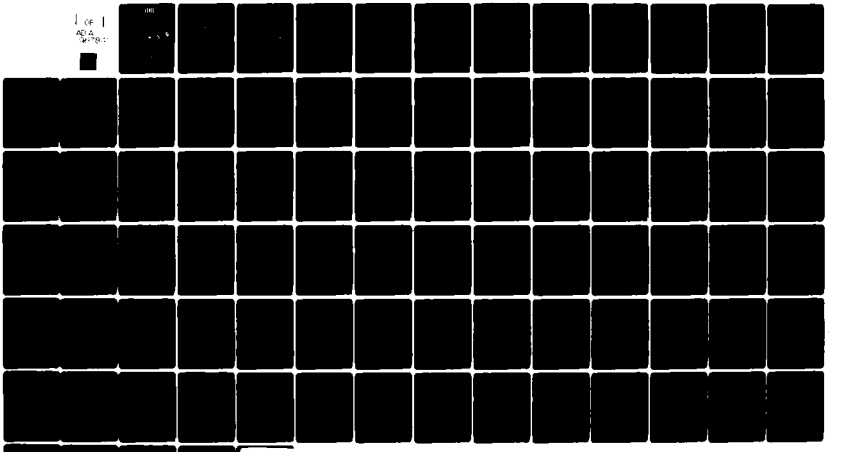

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MOBILIZATION MANPOWER MODEL

FINAL REPORT

prepared for

Support Forces, Manpower and Logistics Branch
Systems Analysis Division
Office of the Chief of Naval Operations
Washington, D.C. 20350

Contract No. N00014-79-C-0527

Administrative Sciences Corporation
FALLS CHURCH, VIRGINIA

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ASC R-127

Final Report

MOBILIZATION MANPOWER MODEL

May 1980

Fred J. Breaux
Henry L. Eskew
Beatrice M. Smith

Contract No. N00014-79-C-0527

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by

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This is the final report of Contract No. N00014-79-C-0527 between the Office of Naval Research and Administrative Sciences Corporation. Monitored by the Office of the Chief of Naval Operations (OP-964), the objective of the work was to develop an automated model for estimating Naval manpower supply and demand in a mobilization scenario. This report provides a non-technical description of the model's structure and capabilities. Documentation of computer programs is contained in an appendix.

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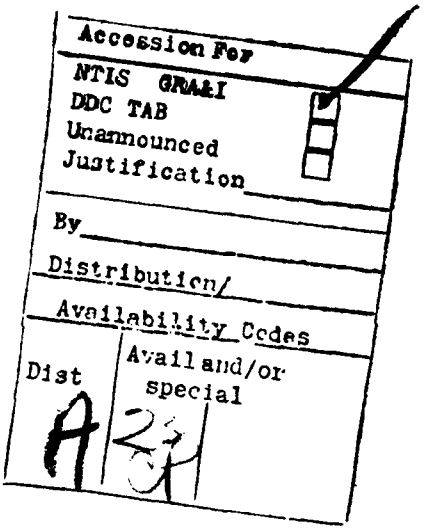
The model's basic measure of time is a ten-day increment. Events are initiated at Pre-M-Day and proceed to M-Day, M+10, M+20, etc. There is a supply sector and a demand sector. Within each is a trained and an untrained (trainee) component. Comprehensive submodels for estimating casualty replacement demand and medical staff requirements are contained in the demand sector. Outputs from the two sectors constitute inputs to a summary model which produces both tabular and graphic comparisons of aggregate supply and demand. Examples of all of the model's outputs are contained in the report. However, they are for illustrative purposes only and should not be construed as representing any official estimates of mobilization manpower supply and demand.



ABSTRACT

This is the final report of Contract No. N00014-79-C-0527 between the Office of Naval Research and Administrative Sciences Corporation. Monitored by the Office of the Chief of Naval Operations (OP-964), the objective of the work was to develop an automated model for estimating Naval manpower supply and demand in a mobilization scenario. This report provides a non-technical description of the model's structure and capabilities. Documentation of computer programs is contained in an appendix.

The model's basic measure of time is a ten-day increment. Events are initiated at Pre-M Day and proceed to M-Day, M+10, M+20, etc. There is a supply sector and a demand sector. Within each is a trained and an untrained (trainee) component. Comprehensive submodels for estimating casualty replacement demand and medical staff requirements are contained in the demand sector. Outputs from the two sectors constitute inputs to a summary model which produces both tabular and graphic comparisons of aggregate supply and demand. Examples of all of the model's outputs are contained in the report. However, they are for illustrative purposes only and should not be construed as representing any official estimates of mobilization manpower supply and demand.

CONTENTS

EXHIBITS

I. INTRODUCTION

Administrative Sciences Corporation (ASC), under Contract No. N00014-79-C-0527 with the Office of Naval Research, has completed development of an automated model which estimates time-phased Naval mobilization manpower supply and demand. Its purpose is to provide an improved capability for addressing mobilization issues which arise in connection with the CPAM process.

The model is programmed in SUPER FORTRAN, a superset of H-Level FORTRAN IV, for operation in a time-shared mode on a Xerox Data System 940. Documentation of the nine computer programs which make up the model is contained in an appendix to this report. The report's primary objective is to provide a non-technical description of the model and its capabilities.

Following this Introduction, Section II describes the accounting structure and presents a brief overview of the model. Section III describes the supply sector and Section IV the demand sector. Finally, Section V discusses a wide range of potential applications of the model.

II. ACCOUNTING STRUCTURE AND MODEL OVERVIEW

The model's basic measure of time is a ten-day increment. Events are initiated at Pre-M Day and proceed to M-Day, M+10, M+20, etc. Increments may be combined to accommodate scenarios prepared in, for example, thirty-day increments after M+90.

There is a supply sector and a demand sector. Within each is a trained and an untrained (trainee) component. Elements of trained supply, for officers and enlistees separately, are:

- Initial Active Force
- Selected Reserve
- Other Inactives (Reserves and Retirees)
- Training Output

Total supply, trained and untrained, consists of the above plus the trainee population.

Elements of trained demand, likewise for officers and enlistees, are:

- Structure Billet Requirements
- Non-structure Requirements (Transients and Students)
- Casualty Replacement Demand

Total demand, trained and untrained, consists of the above plus the demand for trainees.

Outputs from the supply and demand sectors constitute inputs to a summary model which produces both tabular and graphic comparisons of aggregate supply and demand. Exhibit II-1 provides an example of the supply and demand summary tables

EXHIBIT II-1

EXAMPLE SUMMARY SUPPLY AND DEMAND TABLES

5/23/80 DEMORUN ENLISTED/OFFICERS

* CUMULATIVE-SUPPLY *

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
TOTAL	536490	633890	662537	699554	755411	760011	765654	773811	780240	786769	793197	812583	832369	848169
TRAINED	511800	609548	636138	671028	725118	727308	730553	736818	739615	742666	745977	759745	776214	795691
INITIAL AF	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800
SELECT RES	0	82200	82200	82200	82200	82200	82200	82200	82200	82200	82200	82200	82200	82200
OTHR INACT	0	13300	37800	70500	122500	122500	122500	125000	125000	125000	125000	125000	125000	125000
TRAIN OUTP	0	2248	4338	6528	8618	10808	14053	17818	20615	23666	26977	40745	57214	76691
TRAINEE	24690	24342	26399	28526	30293	32703	35101	36993	40625	44102	47220	52838	56155	52478

5/23/80 DEMORUN ENLISTED/OFFICERS

* CUMULATIVE-DEMAND *

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
TOTAL	598310	807249	817111	860388	852892	830165	826036	829583	826545	825496	844582	841601	844991	839597
TRAINED	530589	725813	739812	790533	790356	776412	763058	778565	780086	781394	797363	798764	798836	787119
STRUCTURE	451189	642675	641648	681042	681026	664355	661190	650951	649340	647992	662540	657584	664591	663841
NON-STRUCT	79400	81475	94355	96570	83189	72668	72523	69140	64485	63942	63218	61062	53089	50545
CAS-REPLS	0	1663	3809	12921	26141	39389	49346	58474	66261	69459	71604	70117	71166	72732
TRAINEE	67720	81437	77299	69854	62536	53753	52978	51018	46460	44102	47220	52838	56155	52478

for officers and enlistees combined. Computations of manpower shortages and overages are illustrated in Exhibit II-2, and the same data are displayed in graphic form in Exhibit II-3. It should be emphasized that all model outputs appearing in the report are for illustrative purposes only; they should not be construed as representing any official estimates of wartime manpower supply and demand.

EXHIBIT II-2

EXAMPLE COMPUTATION OF SHORTAGES AND OVERAGES

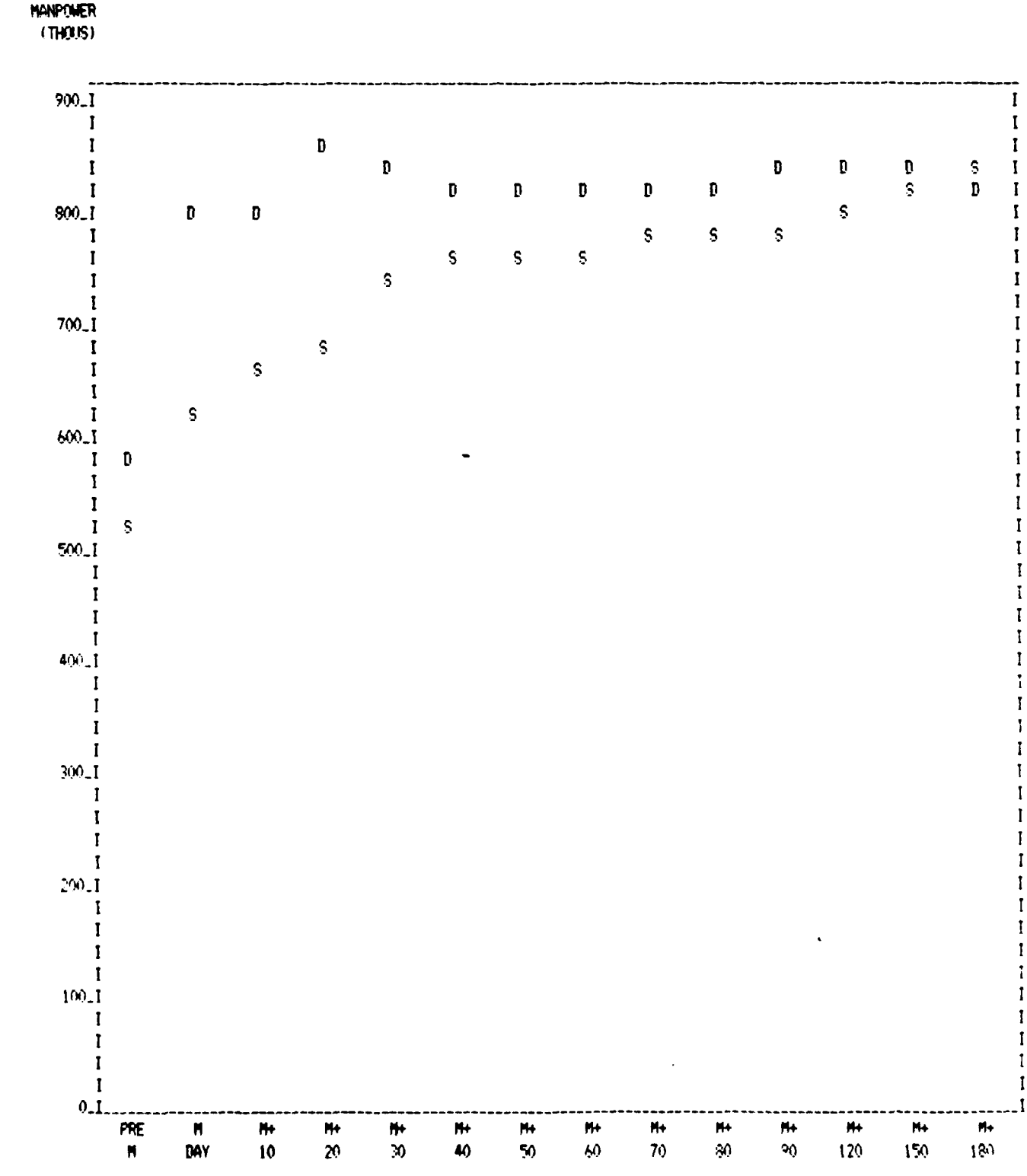
5/23/80 DEMORUN ENLISTED/OFFICERS

* CUMULATIVE-SUMMARY *

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
SUPPLY	536490	633890	662537	699554	755411	760011	765654	773811	780240	786769	793197	812583	832369	848169
TRAINED	511800	609548	636138	671028	725118	727308	730553	736818	739615	742666	745977	759745	776214	795691
TRAINEE	24690	24342	26399	28526	30293	32703	35101	36993	40625	44102	47220	52838	56155	52478
DEMAND	598310	807249	817111	860388	852892	830165	836036	829583	826545	825496	844582	841601	844991	839597
TRAINED	530589	725813	739812	790533	790356	776412	783058	778565	780086	781394	797363	788764	788836	787119
TRAINEE	67720	81437	77299	69854	62536	53753	52978	51018	46460	44102	47220	52838	56155	52478
SHORT(OVER) TOTAL	-61820	-173359	-154574	-160833	-97481	-70154	-70382	-55771	-46305	-38727	-51385	-29019	-12622	8572
TRAINED	-18789	-116264	-103673	-119505	-65238	-49104	-52505	-41746	-40471	-38727	-51385	-29019	-12622	8572
TRAINEE	-43030	-57095	-50900	-41328	-32243	-21050	-17877	-14025	-5835	0	0	0	0	0

EXHIBIT II-3

EXAMPLE GRAPHIC COMPARISON OF AGGREGATE SUPPLY AND DEMAND



III. SUPPLY SECTOR

Exhibit III-1 is a flow chart which identifies and describes the order of computations that result in the supply sector output. These data are generated prior to initiating demand computations since they are required as input to the casualty replacement submodel, one of two major submodels in the demand sector.

Training Output

As the exhibit indicates, supply computations begin with estimation of output from the training establishment. For officers, those numbers are developed outside the model and treated as "thruputs." For enlistees, there is a training submodel. Inputs to the submodel are:

- Length of Pre-M boot camp (wks)
- Pre-M boot input per week
- Pre-M population in "A" schools
- Pre-M population in boot camps
- Recruit attrition rate (%)
- Percent of Post-M boot output assigned to "A" schools
- Length of Post-M boot camp (wks)
- Length of Post-M "A" schools (wks)
- Capacity of boot camps
- Number of Post-M weeks to be processed
- Post-M boot input for each week

Example output is displayed in Exhibit III-2. Note that the output is expressed in weeks rather than ten-day increments. The submodel contains an algorithm which converts those data into the required ten-day format for use

EXHIBIT III-1

SUPPLY SECTOR FLOW CHART

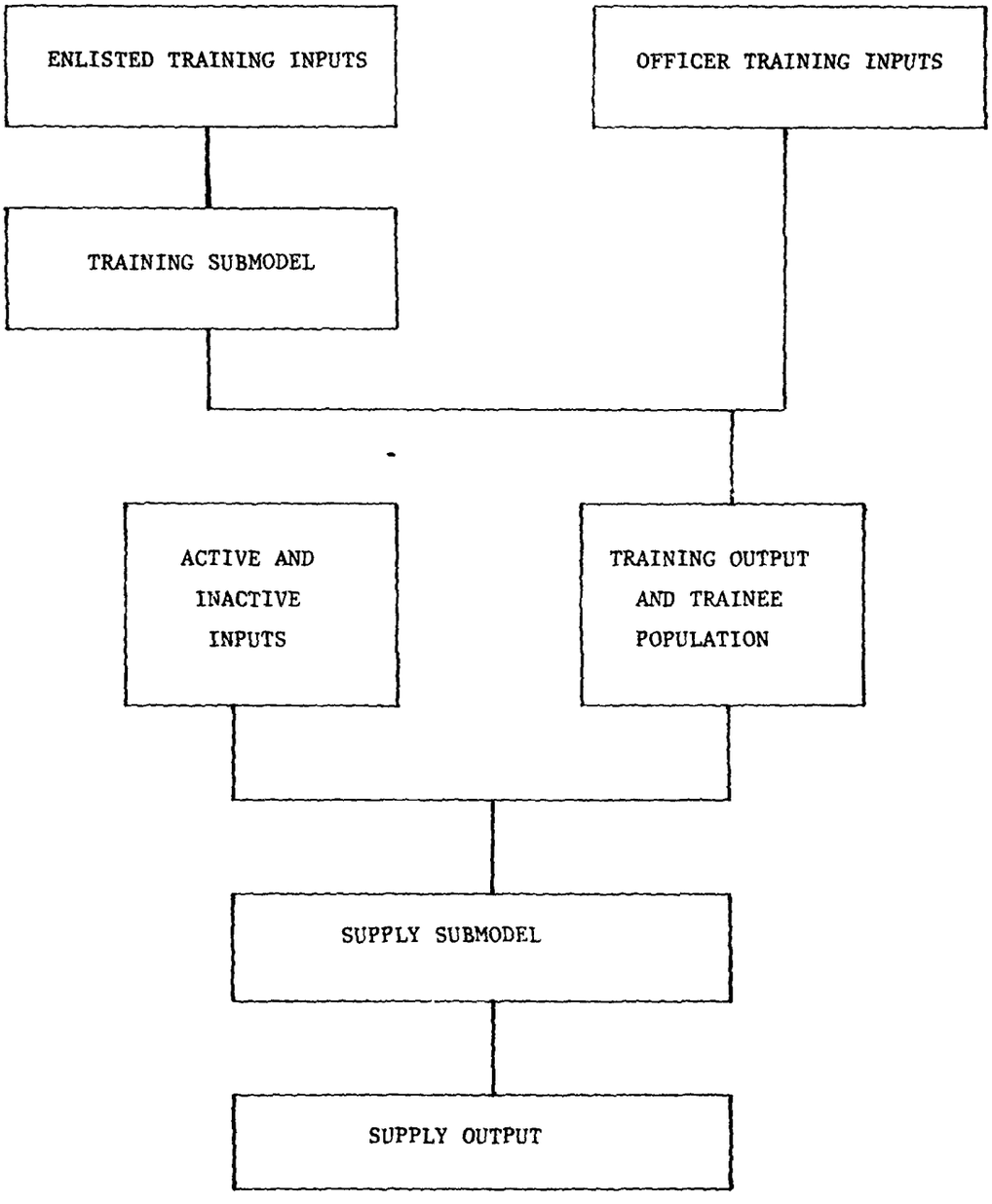


EXHIBIT III-2

EXAMPLE OUTPUT FROM ENLISTED TRAINING SUBMODEL

DEMOSUP WORLD WIDE SUPPLY ENLISTED

TRAINING PROGRAM 30 WEEKS 5/23/80

TIME (WKS)	BOOT INPT	BOOT ATT	BOOT OTPT	BOOT POP	TO FLT	TO A-SCH	A-SCH OTPT	A-SCH POP	TOT POP	TOT OTPT	CUM OTPT
0	0	0	2926	13000	1170	1756	878	9642	22642	2048	2048
1	2800	280	1463	14057	585	878	878	9642	23699	1463	3511
2	3700	370	1463	15924	585	878	878	9642	25566	1463	4974
3	3000	300	1463	17161	585	878	878	9642	26803	1463	6437
4	3000	300	1463	18398	585	878	878	9642	28040	1463	7900
5	3000	300	1463	19635	585	878	878	9642	29277	1463	9363
6	4000	400	1463	21772	585	878	878	9642	31414	1463	10826
7	4000	400	2520	22852	1008	1512	878	10276	33128	1886	12712
8	4000	400	3330	23122	1332	1998	1756	10518	33640	3088	15800
9	5000	500	2700	24922	1080	1620	878	11261	36183	1958	17757
10	5000	500	2700	26722	1080	1620	878	12003	38725	1958	19715
11	5000	500	2700	28522	1080	1620	878	12745	41267	1958	21673
12	5000	500	3600	29422	1440	2160	878	14027	43449	2318	23991
13	5000	500	3600	30322	1440	2160	878	15309	45631	2318	26309
14	5000	500	3600	31222	1440	2160	878	16592	47814	2318	28626
15	5000	500	4500	31222	1800	2700	1512	17786	49002	3312	31938
16	5000	500	4500	31222	1800	2700	1998	18482	49704	3798	35736
17	5000	500	4500	31222	1800	2700	1620	19562	50784	3420	39156
18	5000	500	4500	31222	1800	2700	1620	20642	51864	3420	42576
19	5000	500	4500	31222	1800	2700	1620	21722	52944	3420	45996
20	5000	500	4500	31222	1800	2700	2160	22262	53484	3960	49956
21	5000	500	4500	31222	1800	2700	2160	22802	54024	3960	53916
22	5000	500	4500	31222	1800	2700	2160	23342	54564	3960	57876
23	4000	400	4500	30322	1800	2700	2700	23342	53664	4500	62376
24	4000	400	4500	29422	1800	2700	2700	23342	52764	4500	66876
25	4000	400	4500	28522	1800	2700	2700	23342	51864	4500	71376
26	3000	300	4500	26722	1800	2700	2700	23342	50064	4500	75876
27	0	0	4500	22222	1800	2700	2700	23342	45564	4500	80376
28	0	0	4500	17722	1800	2700	2700	23342	41064	4500	84876
29	0	0	3600	14122	1440	2160	2700	22802	36924	4140	89016
30	0	0	3600	10522	1440	2160	2700	22262	32784	4140	93156

elsewhere in the model. Note also that the submodel computes the size of the trainee population at each time interval. This is the source of data for the untrained component of total supply.

Other Elements of Supply

The initial active force is a single number - actually two numbers, one for officers and the other for enlistees - taken from the FYDP for the time frame in question. The same is true of the Selected Reserve. Input data pertaining to other inactive personnel are based on estimates of the sizes of those populations and the time-phased yields likely to be produced by various management actions. Output from the full supply submodel is illustrated in Exhibit III-3.

EXHIBIT III-3

EXAMPLE OUTPUT FROM SUPPLY SUBMODEL

5/23/80 DEMOSUP ENLISTED WORLD WIDE SUPPLY

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
SUPPLY	456690	531290	555737	588654	637211	641711	646854	652511	658940	665369	671797	691083	710369	725669
TR POP	432000	508648	531238	562028	608818	610908	613653	617418	620215	623166	626477	640145	656114	675091
ACT F	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000
SEL R	0	65600	65600	65600	65600	65600	65600	65600	65600	65600	65600	65600	65600	65600
OTH I	0	9000	29500	58200	102900	102900	102900	102900	102900	102900	102900	102900	102900	102900
T OUT	0	2048	4138	6228	8318	10408	13153	16918	19715	22666	25977	39645	55614	74591
TRAINEE	24690	22642	24499	26626	28393	30803	33201	35093	38725	42202	45320	50938	54255	50578

5/23/80 DEMOSUP OFFICERS WORLD WIDE SUPPLY

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
SUPPLY	79900	102600	106300	110900	113200	113300	113600	121300	121300	121400	121400	121500	122000	122500
TR POP	79600	100900	104900	109000	116300	116400	116900	119400	119400	119500	119500	119600	120100	120600
ACT F	79800	79800	79800	79800	79800	79800	79800	79800	79800	79800	79800	79800	79800	79600
SEL R	0	16600	16600	16600	16600	16600	16600	16600	16600	16600	16600	16600	16600	16600
OTH I	0	4300	8300	12300	19600	19600	19600	22100	22100	22100	22100	22100	22100	22100
T OUT	0	200	200	300	300	400	900	900	900	1000	1000	1100	1600	2100
TRAINEE	0	1700	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900

IV. DEMAND SECTOR

Overview

Exhibit IV-1 identifies and describes the order of computations which ultimately result in the detailed demand sector output. The first set comprises those computations associated with casualty estimation. Outputs from the casualty submodel become inputs to a second submodel which estimates requirements for physicians, nurses and hospital corpsmen both within and outside theaters of operations. Outputs from this submodel are combined with the casualty output and with externally generated estimates of non-theater demand to serve as inputs to the overall demand submodel. The following paragraphs provide amplification of the principal components of the demand sector.

Theater Structure, Casualty Replacement and Medical Staff Demand

As Exhibit IV-1 indicates, one of the inputs to the casualty submodel is the size of exposed populations (officers and enlistees) for each theater of operations being examined. On the assumption that all theater structure billets can be and are filled from available supply (shortages being absorbed out-of-theater), theater exposed populations and theater structure demand are identical. Determination of those requirements is a very complicated and time-consuming process which involves the following general steps:

(1) Defining the size, shape, readiness condition and deployment posture of the Navy and Marine Corps at the time immediately prior to beginning of the scenario

(2) Organizing ships and aircraft into notional task forces in accordance with availability times, locations and scenario applications

EXHIBIT IV-1

DEMAND SECTOR FLOW CHART

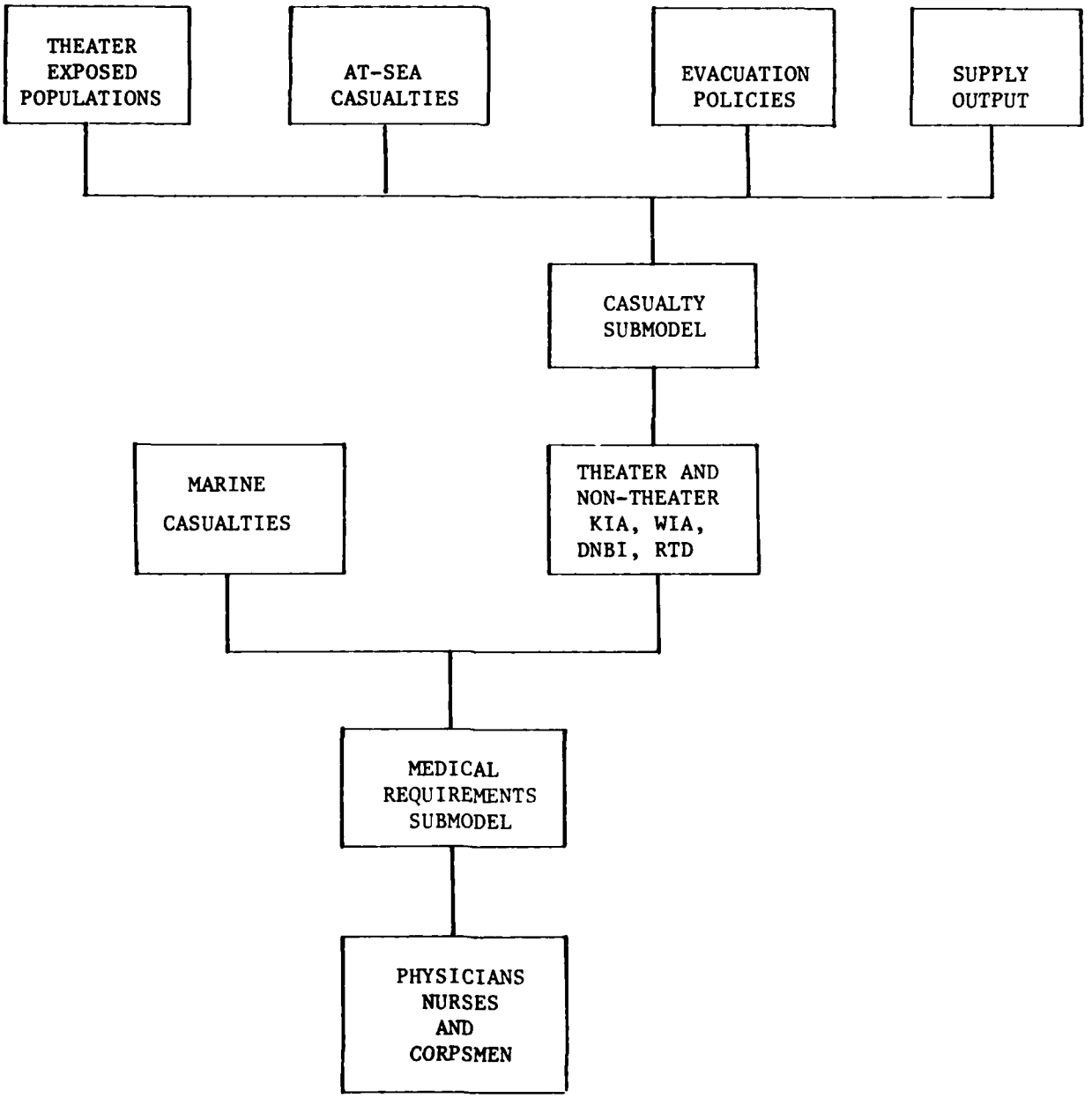
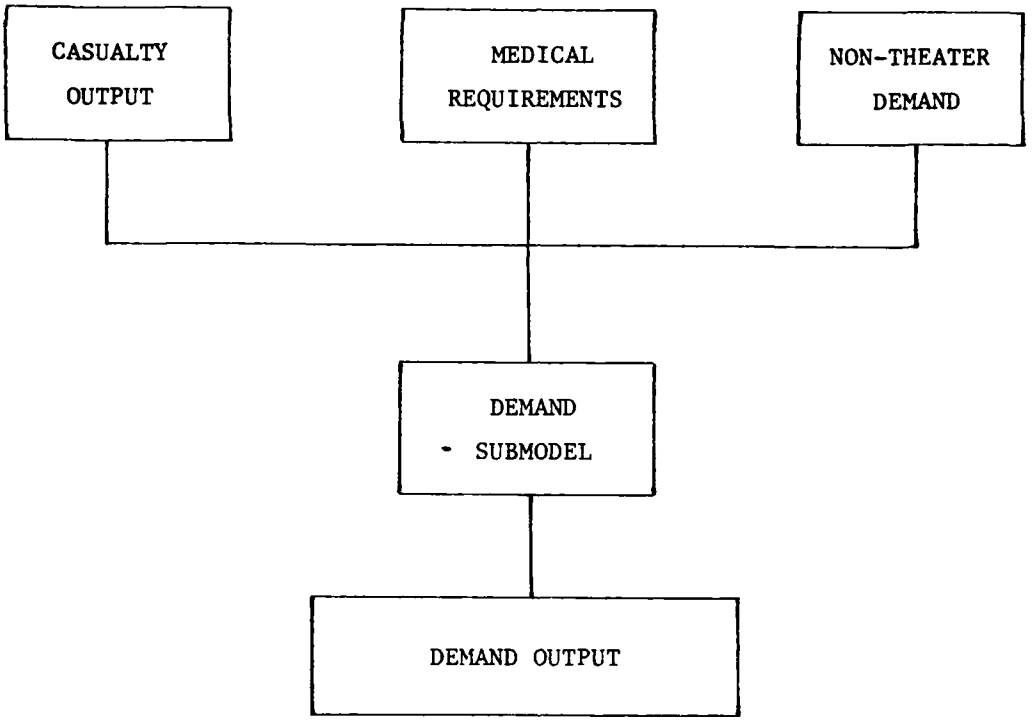


EXHIBIT IV-1 (cont'd.)



(3) Meshing all force units, their ancillary attachments and direct support units into a "time line" and into geographic locations for a period beginning with pre-event status and running beyond expiration of scenario time

(4) Determining indirect support requirements necessary to support the scenario, and determining the political or policy billets that would exist either for national purposes or in connection with internal DOD policies

Since much of the above is judgmental in nature and does not lend itself to automation, both theater and non-theater structure demand are computed outside the model and thruput. Since those requirements are developed twice a year (by OP-11) in connection with the OSD-directed Wartime Manpower Program System (WARMAPS), a source for "base case" inputs is readily available.

Casualties estimated to occur at sea in connection with aircraft losses, ship sinkings and major battle damage are likewise treated as thruputs. Output from the supply submodel is required as an input to the casualty submodel since non-theater exposed populations are determined by subtracting theater structure demand (the same as theater exposed populations) from total supply. Appendix A provides a detailed discussion of the casualty submodel. Exhibit IV-2 provides an example of its output applicable to theater casualties and replacement demand, and Exhibit IV-3 illustrates non-theater demand.

In connection with any mobilization manpower analysis, considerable interest centers on the magnitude and location of medical staff requirements - physicians, nurses and corpsmen. Because of that, and because computation of those requirements is ideally suited for automation, a medical requirements submodel was developed as part of the demand sector.

EXHIBIT IV-2

EXAMPLE CASUALTY SUBMODEL OUTPUT, THEATERS

5/23/80 DEMORUN TOTAL THEATER OFF&ENL

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+100	M+110	M+120
POP	122360	142499	218752	293248	299963	315968	366946	375878	378420	382096	387817	387817	390245	398728
ADJ-POP	122360	142499	218752	293248	299963	315968	366946	375878	378420	382096	387817	387817	390245	398728
BTL CAS	0	0	0	9265	5474	4302	8484	3543	4399	5447	0	0	1299	0
KIA	0	0	0	3803	2737	2151	3550	1771	2199	2248	0	0	456	0
WIA	0	0	0	5462	2737	2151	4934	1772	2200	3099	0	0	843	0
KIA	0	0	3	3810	2744	2158	3557	1841	2335	2433	85	85	541	85
WIA	0	0	11	5485	2760	2174	4957	2030	2704	3444	345	345	1188	345
EVAC	0	0	3	2279	3421	2047	2587	2376	1610	1677	834	152	337	337
HOSP	0	0	9	3206	-662	126	2369	-345	1095	1767	-488	193	851	8
DNBI	0	1368	1987	2816	3263	3388	3756	4086	4149	4183	4235	4266	4279	4339
EVAC	0	66	161	630	1155	1264	1019	784	823	616	404	408	410	414
HOSP	0	1302	1826	2186	2108	2124	2737	3301	3325	3567	3830	3858	3869	3926
DOW	0	0	0	28	14	11	48	19	26	58	6	6	20	6
RTD	0	101	1058	2404	2947	2527	2083	3509	4372	3801	3860	4608	4885	4171
EATS	0	1201	1978	4938	3423	3135	6111	5539	5561	7037	6513	5951	5766	5523
REPLS	0	1267	944	9707	5819	5192	10187	4447	4817	6260	805	89	1124	600
CUM-REP	0	1267	2211	11917	17736	22928	33115	37563	42379	48640	49445	49534	50658	51257

EXHIBIT IV-3

EXAMPLE CASUALTY SUBMODEL OUTPUT, NON-THEATERS

5/23/80	DEMORUN			TOTAL NON-THEATER					ENL&OFF					
	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
POP	168464	196032	196032	196032	221098	221098	221098	223829	223829	223829	234740	234740	234740	237439
ADJ-POP	503015	759439	630482	525443	573171	546212	452127	444723	445621	446465	441650	439593	461202	466995
DNBI	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WIA-TR	0	0	6	4558	6842	4094	5174	4752	3220	3354	1668	1652	1480	1260
DNBI	0	5947	7967	7618	8352	8685	7529	6501	6543	6138	5693	17186	17392	17892
TR	0	132	322	1260	2310	2528	2038	1568	1646	1232	808	2464	2522	2538
OTHR	0	5815	7645	6358	6042	6157	5491	4933	4897	4906	4885	14722	14870	15354
DOW-DIS	0	2	5	602	909	560	692	631	436	447	225	246	225	197
RTD	0	1551	4933	7206	6565	6109	6093	5848	6234	7088	7808	27786	23952	22881
PATS	1100	5495	8529	12896	20616	26725	32643	37417	40509	42466	41793	32599	27294	23368
REPLS	0	4265	2711	-849	-523	47	-602	-916	-1338	-2182	-2924	-13065	-9082	-7527
CUM-REP	0	4265	6976	6127	5604	5652	5049	4134	2796	614	-2310	-15374	-24456	-31984

This submodel basically operates off outputs from the casualty submodel and a set of medical care factors supplied by BUMED. The factors are expressed in terms of number of physicians, nurses and corpsmen required for each day of a patient's hospitalization; for example, 1.196 physicians for day 1; 0.107 for days 2 through 6; etc. There are separate factors for theater and non-theater, and for WIA/NBI and diseased. Appendix B contains a complete list of the factors.

The computations involved are straightforward conceptually, although by no means trivial from a programming point of view (reference the description in Appendix C of the program labeled "MMMHOSPRG"). Requirements for each type of staff resource are computed separately for <u>each day</u> in the scenario. The following is an example of the computation of physician requirements for day 3.

Day Hospitalized	Number Hospitalized	Number Remaining	Care Factor	Requirement
3	50	50	1.196	59.8
2	50	45	0.107	4.8
1	50	40	0.107	4.3
		TOTAL REQ'T FOR DAY:		68.9

Differences between numbers hospitalized and numbers remaining are attributable to returns-to-duty, evacuations, discharges and died-of-wounds - information on which is obtained from the casualty submodel. After performing these calculations, the medical requirements submodel scans each ten-day time increment for its maximum requirement, and records that value as the increment's requirement. Example outputs from the submodel appear in Exhibits IV-4 and IV-5.

EXHIBIT IV-4

EXAMPLE MEDICAL REQUIREMENTS SUBMODEL OUTPUT, THEATERS

5/26/80 DEMORUN TOTAL THEATER WIA\NBI

	ADMISSIONS	PATIENTS	DOCTORS	NURSES	CORPSMEN
M	274	213	50	86	136
M+10	409	468	83	175	267
M+20	6048	3566	1011	1547	2514
M+30	3412	3407	702	1341	2062
M+40	2851	1963	504	824	1316
M+50	5708	3740	977	1576	2531
M+60	2848	3586	644	1359	2049
M+70	3534	2893	630	1148	1801
M+80	4281	3928	802	1531	2374
M+90	1192	3767	446	1299	1858
M+100	1199	3235	355	1095	1575
M+110	2044	2881	429	1035	1547
M+120	1213	2575	335	901	1312
M+130	1223	2420	310	843	1232
M+140	1869	2287	377	840	1269
M+150	1223	2468	326	866	1265
M+160	1223	2342	305	819	1199
M+170	1622	2221	343	804	1205
M+180	1234	2295	312	809	1188
M+190	1234	2223	300	782	1150
M+200	1234	2129	294	753	1110
M+210	1235	2025	288	720	1066
M+220	1235	2025	288	721	1066
M+230	1236	2026	288	721	1066
M+240	0	1903	141	609	834
M+250	0	1000	60	312	426

EXAMPLE IV-5

EXAMPLE MEDICAL REQUIREMENTS SUBMODEL OUTPUT, WORLDWIDE

5/26/80 DEMORUN WORLD WIDE WIA&DIS

	ADMISSIONS	PATIENTS PEAK	DOCTORS	NURSES	CORPSMEN	OFFICERS	ENLISTED	TOTAL
M	5286	5092	341	1569	2072	1910	2072	3983
M+10	6862	10820	590	2921	3759	3511	3759	7270
M+20	15089	17143	1758	5542	7708	7300	7708	15008
M+30	14234	22991	1714	6980	9350	8695	9350	18044
M+40	12553	27098	1662	7641	10018	9303	10018	19321
M+50	15646	36079	2329	9654	12663	11983	12663	24646
M+60	12309	42698	2176	10901	13956	13078	13956	27034
M+70	12280	46999	2208	11554	14669	13762	14669	28431
M+80	12887	50082	2330	12112	15357	14442	15357	29799
M+90	8804	51578	1953	12139	15123	14092	15123	29215
M+100	8187	51250	1757	11686	14434	13443	14434	27877
M+110	9218	51057	1746	11422	14083	13168	14083	27251
M+120	8381	48282	1564	10772	13235	12337	13235	25572
M+130	8204	44460	1416	9928	12211	11344	12211	23555
M+140	9008	43325	1440	9672	11929	11112	11929	23041
M+150	8375	43627	1398	9756	12006	11155	12006	23160
M+160	8234	43071	1366	9603	11812	10969	11812	22782
M+170	8722	42989	1400	9545	11752	10945	11752	22697
M+180	8347	44294	1395	9800	12032	11195	12032	23228
M+190	8270	47134	1424	10340	12653	11764	12653	24417
M+200	8271	48744	1438	10626	12972	12064	12972	25036
M+210	8271	49409	1443	10749	13109	12192	13109	25301
M+220	8271	50137	1450	10893	13276	12343	13276	25619
M+230	8270	50673	1455	10998	13398	12453	13398	25851
M+240	0	49831	1184	10669	12878	11853	12878	24731
M+250	0	41466	833	8452	10003	9286	10003	19289

Non-Structure Billet Requirements

The demand submodel has the capability of estimating non-structure billet requirements, which consist of transients and students and are associated only with the non-theater, as a (variable) percentage of structure requirements. It can also accept them as thruputs. The demand submodel's full output is illustrated in Exhibits IV-6 and IV-7.

Demand for Trainees

Certain mobilization manpower analyses - notably OSD's WARMAPS - simply set trainee demand equal to trainee supply. However, for the purposes of this model it was considered useful to allow the relationship between trainee demand and supply to reflect potential manpower shortages. Thus, on the assumption that it would take ninety days to train for and fill an empty billet once it is perceived, and assuming further a ten percent trainee attrition rate, the model takes successive ninety-day "looks" out into scenario time, records any shortages that exist, adjusts for attrition, and adds the result to trainee supply to compute trainee demand for each period. Since those computations require all other demand and supply computations to have been completed, they are done in the summary model and reflected in the output illustrated in Section II. Output shown in this section is limited to the demand for trained manpower.

EXHIBIT IV-6

EXAMPLE DEMAND SUBMODEL OUTPUT, THEATERS

5/23/80 DEMORUN ENLISTED TOTAL THEATER

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
DEMAND	111014	129923	199638	275071	285698	305204	358476	371428	377803	386815	392303	403402	405979	412438
TRAINED	111014	129923	199638	275071	285698	305204	358476	371428	377803	386815	392303	403402	405979	412438
STRUCTURE	111014	128774	197640	264065	269318	284096	328003	336872	338861	342140	346930	356426	356698	361104
THEATER	111014	128374	196948	270098	283515	304934	356042	370251	370848	373356	378556	388547	389438	394311
NON-THET	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEDICAL	0	400	692	3034	2513	1790	3163	2782	2547	3210	2800	2356	2334	2266
BIL LOS	0	0	0	-9067	-16710	-22628	-31202	-36161	-34534	-34426	-34426	-34477	-35074	-35473
NON-STRUC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAS-REPLS	0	1149	1998	11006	16380	21108	30473	34556	38942	44675	45373	46976	49281	51334
KIA	0	0	3	3546	6099	8076	11367	13080	15228	17478	17552	18199	18736	19152
WIA	0	0	9	5110	7676	9667	14252	16128	18596	21754	22055	23747	25251	26524
DNBI	0	1241	3036	5575	8509	11553	14919	18576	22293	26038	25828	41351	53115	64952
RTDS	0	-92	-1051	-3226	-5904	-8188	-10064	-13228	-17175	-20596	-24062	-36321	-47822	-59294

EXHIBIT IV-7

EXAMPLE DEMAND SUBMODEL OUTPUT, NON-THEATERS

5/23/80 DEMORUN ENLISTED TOTAL NON-THEATER

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
DEMAND	162976	174810	176598	178485	202423	205749	208785	212359	214049	215249	224600	219875	217266	217634
TRAINED	162976	174810	176598	178485	202423	205749	208785	212359	214049	215249	224600	219875	217266	217634
STRUCTURE	135813	155219	155219	155219	173308	173308	173308	174369	174369	174369	183101	183101	183101	185245
THEATER	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NON-THET	135813	153546	152151	150545	166472	165080	163809	163196	162247	162222	170777	172222	173430	175478
MEDICAL	0	1673	3068	4674	6836	8228	9499	11173	12122	12147	12324	10879	9671	9767
BIL LOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NON-STRUC	27163	15522	15522	15522	17331	17331	17331	17437	17437	17437	18310	18310	18310	18525
CAS-REPLS	0	4070	5857	7744	11785	15110	18146	20553	22243	23443	23189	18464	15855	13865
KIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WIA	0	0	3	2282	5703	7750	10337	12713	14323	16000	16834	17660	18400	19030
DNBI	0	5597	11990	17600	23399	29390	34505	38843	43177	47320	51237	63104	75171	87719
RTDS	0	-1527	-6136	-12138	-17317	-22029	-26695	-31003	-35257	-39877	-44882	-62300	-77715	-92885

V. MODEL APPLICATIONS

Potential applications of the model, both within the CPAM process and in other contexts, fall into four general categories. Each is discussed below.

Base Case Updates

At any one time, the model will be "loaded" with a set of base case inputs to which there will correspond a unique set of outputs. These will reflect the size and composition of the fleet, scenarios and other policy guidance, and supply data applicable to a given time frame. Each of the above can change without a change in time frame, and in general they will all change with a change in time frame. Thus one application of the model is to simply maintain currency; i.e., to update the inputs and execute the full model whenever there is a change in the basic (and official) determinants of mobilization manpower supply and demand.

Training Excursions

In Section III, eleven different inputs to the enlisted training submodel were listed. Each of these is either a policy variable or a magnitude about which there is some uncertainty. Changes in one or more of them could have a significant impact on output from the training establishment during a mobilization period. Thus the model can be used to examine the sensitivity of training output to proposed policy changes, or to certain inputs - such as yields from the draft - characterized by uncertainty.

Casualty, Medical Requirements and Evacuation Policy Analysis

Applications of the model in this area are virtually limitless. First, it is an area where the input factors are subject to extreme uncertainty. A

wide range of sensitivity analyses is suggested. And, as with the training submodel, policy variables - especially those pertaining to evacuation - play a critical role.

There is a great deal of interdependence between casualties, medical staff requirements and evacuation policy which the model can be used to analyze. For example, casualty estimates and evacuation policies in combination determine theater requirements for physicians, nurses and hospital corpsmen. However, a particular set of those requirements might be considered infeasible. Thus evacuation policies would have to be modified to result in theater medical requirements which <u>are</u> feasible. This, in turn, would have an effect on return-to-duty rates, which would be reflected in a modified casualty replacement demand, and ultimately in the "bottom line" - manpower shortages and overages. While no doubt requiring iterative use of the model, this type of application is quite legitimate and potentially quite useful.

A final application in this area is to use the model's output as a basis for examining logistic support requirements. For example, implicit in the evacuation and returns-to-duty data are a set of transportation requirements. Analysis of those requirements might reveal them to be substantially greater than what can be met by programmed resources. Thus, as in the immediately preceding example, this would require a change in evacuation policy, setting in motion the same chain which ends with a new relationship between aggregate manpower supply and demand.

<u>Qualitative Manpower Analysis</u>

While it is important for planners to have data on the balance or imbalance between total manpower supply and demand, it may be even more

important to have those same types of insights with respect to particular categories of manpower. The model can be used to examine time-phased requirements for, and availability of, machinist's mates, electronics technicians, etc. It is especially well suited for applications of this sort in that, rather than using Navy-wide averages as inputs, more precise data can be employed. Naturally, much of the relevant data gathering and analysis would have to be done outside the model, but as a vehicle for processing and displaying those results, and for performing many of the requisite calculations, the model is quite valuable.

APPENDICES

APPENDIX A
CASUALTY REPLACEMENT SUBMODEL

Background

Integral to any mobilization/wartime manpower analysis are the issues of casualties and returns-to-duty. Obtaining realistic estimates of those magnitudes is a difficult task because of: (1) the large number of interacting variables - size and composition of exposed forces, scenario events and duration, areas of deployment, evacuation policies in effect, etc.; (2) the correspondingly large number of calculations required; and (3) the limited amount of empirical data available. All of this suggests the need for algorithms which "simulate" the casualty, treatment and discharge cycles in any given conflict. One such model, known as MEDCON II, was developed at the Bureau of Medicine and Surgery (BUMED). A considerable amount of the content of that model has been incorporated into this submodel, and the final product has been fully coordinated with BUMED.

Basic Features

Provision is made for the following types of casualties to occur within theaters:

- Killed/Missing in Action (KIA)
- Wounded in Action (WIA)
- Disease and Non-Battle Injuries (DNBI)

Casualty replacement may be either with or without delay. The number of casualties, by type, is computed by multiplying a set of population inputs by casualty-rate factors, also inputs. In addition, provision is made for direct

"thruput" of special-case casualty data associated with losses and damage to ships and aircraft. A fraction of theater WIA and DNBI are hospitalized and the balance are evacuated to CONUS, with provision made for evacuation delays. Sizes of the fractions depend on what evacuation policies are in effect at any period. The model will accommodate essentially any number of theaters, all of whose evacuees are accumulated in CONUS. Only DNBI originate within CONUS. Provision is made for Died-of-Wounds (DOW) within theaters, and DOW and disability discharges within CONUS.

Returns-to-Duty (RTD) are computed on the basis of mean time to discharge plus pipeline time for each time of hospitalization and evacuation policy. Theater replacement demand is defined as total casualties less the sum of RTD's for each period.

Analytics and Algorithms

It will be convenient to begin this section with a word on notation. Each ten-day time period will be denoted by a subscript 't.' Thus t=1 is the period Pre-M to M-Day; t=2 is M-Day to M+10; t=3 is M+10 to M+20; etc. The subscript t=0 is a special case, reserved for Pre-M population and patient inventories.

This model, like most discrete-time formulations, involves two types of variables; stocks and flows. They are best defined by example. PAT_t denotes the size of a specific patient pool at the end of period 't.' It is a stock measure. WIA_t denotes the number of Wounded in Action during period 't.' It is a flow measure. Generally speaking, the summation of

flows produces stocks. As a simple example, assuming all WIA and DNBI are hospitalized and survive, and ignoring any initial patient pool, we have:

$$PAT_t = \Sigma WIA_t + \Sigma DNBI_t - \Sigma RTD_t,$$

where the summations are taken from t=1 through the period in question.

The first analytic complication arises when a delay in casualty replacement is specified. The population inputs which would normally be multiplied by casualty-rate factors cannot be used directly because the replacement delay causes the actual populations to fall short of the original objectives. Casualties must therefore be computed from adjusted populations, but those populations are in turn dependent on contemporaneous casualties. What emerges is the need for a simultaneous equation system. The basic relationships are:

$$TCAS_t = ICAS_t + k(ADJ_{t-1} + ADJ_t)/2 \quad (1)$$

$$ADJ_t = ADJ_{t-1} + (INT_t - INT_{t-1}) - TCAS_t + TCAS_{t-x} \quad (2)$$

where

TCAS = total casualties (KIA + WIA + DNBI)

ICAS = input casualties

k = combined casualty-rate factor (for 10-day period)

ADJ = adjusted population

INT = initial population

t = time period

x = length of casualty replacement delay (in periods)

Equation (1) states that total casualties are the sum of input and computed casualties. The latter are determined by multiplying an average of beginning and ending adjusted populations by a combined casualty-rate factor.* Once the adjusted populations are computed from the simultaneous system, individual casualty-rate factors are applied to determine WIA, KIA and DNBI.

Equation (2) states that the ending adjusted population, ADJ_t, is determined by first adding to its beginning value the amount of the target increase, $(INT_t - INT_{t-1})$, then subtracting the current period's casualties, and finally adding in delayed casualty replacement.

Substituting Eq. (1) into Eq. (2) and simplifying, the following expression emerges for computing adjusted populations:

$$ADJ_t = \Big[(1-k/2)\ ADJ_{t-1} + (INT_t - INT_{t-1}) - ICAS_t + k(ADJ_{t-x-1} + ADJ_{t-x})/2 + ICAS_{t-x}\Big] /(1+k/2)$$

The adjusted populations are thereby consistent with the simultaneously-determined losses for the same period.

As mentioned earlier, a portion of theater WIA and DNBI are evacuated to CONUS and the remainder are assigned to theater hospitals. These allocations are determined by a set of input percentages which reflect different evacuation policies for various phases of the scenario. Provision for evacuation delays is also provided through inputs. Once the numbers of

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*The averaging procedure applies to all periods except t=1. There it is assumed that the Pre-M population remains constant for the nine days preceding M-Day. A weighted average is therefore computed, with the weights being .9 and .1.

casualties assigned to theater and CONUS hospitals are known, and after allowances for DOW and disability discharges have been made, the next analytic problem is that of computing returns-to-duty for each time period.

Fortunately, the RTD problem is easily treated within a general Markovian framework. To elaborate, assume that a scenario consists of only three periods, and consider the following matrix:

		Hospitalizations		
	t \ t	1	2	3
Returns	1	p_{11}	0	0
	2	p_{21}	p_{22}	0
	3	p_{31}	p_{32}	p_{33}

Each non-zero element represents the probability of, or fraction, being returned in the period denoted by the first subscript, given that hospitalization occurred in the period denoted by the second. For example, p_{32} is the fraction of those returned in period 3 who entered in period 2. Note that all elements to the right of the diagonal are definitionally equal to zero since returns cannot occur prior to admissions. Now let N_1^h, N_2^h, N_3^h represent the number who are hospitalized (and who also survived) in period 1, 2, and 3. The number returned in each period, N_t^r, is then computed as:

$$N_1^r = p_{11}N_1^h$$

$$N_2^r = p_{21}N_1^h + p_{22}N_2^h$$

$$N_3^r = p_{31}N_1^h + p_{32}N_2^h + p_{33}N_3^h$$

These sums obey the rules of matrix algebra; i.e., in this case, post-multiplication of a matrix (the p_{ij}) by a conforming vector (N^h). Since the elements of the vector, hospitalizations, have been computed by the model, the remaining analytic problem is to quantify the p_{ij}, the so-called "transition" matrix.

Determining values for the p_{ij} requires that certain assumptions be made. First, the flow of hospitalizations is assumed to be uniformly distributed over any given ten-day period. In other words, $N_t^h/10$ arrive on each day in a ten-day period. Since input data are provided on mean times to discharge plus pipeline times, one approach would be to assume that, given for example a mean time to discharge of 25 days and a pipeline time of 5 days, all persons hospitalized on day one would be returned on day 31; those admitted on day 2 would be returned on 32; etc. While greatly simplifying the problem, this approach does not seem very realistic. It assumes there is no variability around the mean discharge times. A better approach is to make an explicit assumption about the variance, and about the probability distribution, of returns-to-duty. This model assumes returns to be normally distributed with variance equal to the mean discharge time. The assumption of equivalence between mean and variance is frequently used in reliability and maintainability work when data is available only for such parameters as mean-time-between-failures, mean-time-to-repair, etc. And, results of the joint assumptions of normality and equivalence of mean and variance are intuitively reasonable in the present context. For example, using the same data hypothesized above, approximately two-thirds of hospitalizations on day 1 would be returned between the 25th and 35th days, and 95% between the 20th and 40th days.

Once a statistical distribution of returns has been computed for each day in the 10-day admissions period, they must be combined into a single distribution (also normal) applicable to the full period. Then, that distribution is divided into its ten-day increments, and the individual probabilities in each increment are summed to finally produce the required p_{ij}. All of these computations are performed, with the aid of the IBM Scientific Subroutine Package, as part of a separate pre-processor. They are then written into files in transition matrix format and are accessed directly by the model.

An example of the model's output appears in Section IV of the report. By way of summary, initial populations and at-sea casualties are provided as inputs. Other KIA and WIA, and all DNBI, result from multiplying input factors by adjusted populations, and in turn are multiplied by other input percentages to compute evacuations and DOW. Procedures used for computing adjusted populations, RTD, and patients have been described above, with the exception that the patients computation also adds in the initial patient pool. Finally, net replacement demand for each period is total casualties less RTD's. The summation of those results is total casualty replacement demand. Exhibit A-1 displays a set of casualty-rate factors, evacuation percentages and policies, discharge/pipeline times, delays and other data which were provided by BUMED and are presently being used in the submodel.

EXHIBIT A-1

SELECTED INPUTS AND PARAMETER VALUES*

Casualty-Rate Factors

KIA: Navy with Marines

Amphibious assault:

Forward 3.0/1000/Day

Support 0.4/1000/Day

High Intensity Sustaining:

Forward 1.3/1000/Day

Support 0.2/1000/Day

WIA: Navy with Marines

Amphibious assault:

Forward 10.7/1000/Day

Support 1.3/1000/Day

High Intensity Sustaining:

Forward 4.5/1000/Day

Support 1.1/1000/Day

All other KIA & WIA: 0 (thruput)

DNBI: 1/1000/Day

Evacuation Policies

Pre-M to M+10:	60-day
M+11 to M+40:	15-day
M+41 to M+70:	30-day
M+71 to M+190:	60-day

Evacuation Rates

	15-day Policy	30-day Policy	60-day Policy
WIA:	.83	.68	.44
DNBI:	.38	.20	.096

EXHIBIT A-1 (cont'd.)

Mean Discharge and Pipeline Times (in days)

	15-day Policy	30-day Policy	60-day Policy
Non-Evacuees			
WIA - Discharge:	8	15	25
Pipeline:	1	1	1
DNBI - Discharge:	5	8	10
Pipeline:	1	1	1
Evacuees			
WIA - Discharge:	64	85	145
Pipeline:	15	15	15
DNBI - Discharge:	33	57	99
Pipeline:	15	15	15
Within CONUS			
DNBI - Discharge:	10	10	10
Pipeline:	1	1	1

Evacuation Delays

WIA: 5 days

DNBI: 5 days

Other Losses from Hospitalizations

Non-Evacuees	
DOW:	3%
Evacuees	
DOW:	0
Disab. Discharge:	
WIA:	8.95%
DNBI:	0.92%

*Source: Bureau of Medicine and Surgery

APPENDIX B

MEDICAL CARE REQUIREMENTS BY LENGTH-OF-STAY*

Theater	Day	Doctors	Nurses	Corpsmen
WIA/NBI	1	1.196	.908	1.89
	2	.107	.363	.503
	3	.107	.338	.465
	4	.107	.338	.465
	5	.107	.334	.458
	6	.107	.312	.426
	7+	(see note 1)	.312	.426
Disease	1	.114	.242	.321
	2	.040	.242	.321
	3	.040	.229	.301
	4	.040	.229	.301
	5	.040	.209	.272
	6	.040	.186	.236
	7+	(see note 1)	.186	.236
Non-Theater				
WIA/NBI	1	.33	.595	.827
	2-10	.074	.496	.693
	11-50	(see note 2)	.242	.302
	51+	.015	.202	.236
Disease	1	.210	.302	.386
	2-10	.038	.280	.354
	11-15	.038	.204	.241
	16-50	.016	.204	.241
	51+	.016	.195	.227

*Source: Bureau of Medicine and Surgery

APPENDIX B (cont'd.)

Notes:

(1) Requirements for physician care of patients retained in theater beyond the sixth day vary with the evacuation policy.

	15-day Policy	30-day Policy	60-day Policy
WIA/NBI	.04	.05	.06
Disease	.017	.022	.022

(2) Requirements for physician care of WIA/NBI patients in the reconstruction period vary with the evacuation policy.

15-day Policy	30-day Policy	60-day Policy
.056	.059	.061

APPENDIX C
COMPUTER PROGRAM DOCUMENTATION

The nine separate computer programs which make up the model are documented in this appendix. Documentation consists of a brief narrative description of each program's functions, inputs, outputs, uses and options. Following each narrative is a program listing.

In terms of computer processing, each of the programs operates independently. Input and output for each are stored in files. All inter-program communication is accomplished via these files. An advantage of this type of modular processing is that it minimizes the effects of any execution interrupt. If the interrupt is caused by machine malfunction, the amount of re-running is very small. User interruptions cause no problem at all since individual execution times are short and easily adaptable to scheduling. Flexibility is maintained by allowing the user to specify which files are to be used and to be generated at each program execution.

Each program is identified by a mnemonic label. The order in which they appear, and the sections of the overall model to which they relate, are as follows:

Supply:	MMMSUPPRG
Evacuation Policy & Casualty-Related Data:	NUPOLPRG
Casualty Estimation:	WMPREPROC
	MMMCASPRG
	MMMPRNPRG
Medical Requirements:	MMMHOSPRG
	MEDPRGM
Demand:	MMMDEMPRG
Comparisons and Graphs:	MMMDSMODL

MMMSUPPRG

Function

This program creates supply tables.

Input

- Table ID, TITLE, TYPE (OFFICER or ENLISTED)
- The initial active force
- Selective Reserve personnel by time period, if any
- Other inactive personnel by time period, if any
- Trainee data (enlisted supply tables only)
    - Length of PRE-M boot camp (wks)
    - PRE-M boot input/wk
    - PRE-M population in "A" schools
    - PRE-M population in boot camps
    - Recruit attrition rate (%)
    - POST-M-day % to "A" school (%)
    - Length of POST-M boot camp (wks)
    - Length of POST-M "A" schools (wks)
    - Capacity of boot camps
    - Number of POST-M weeks to be processed
    - POST-M boot input for each week

Output

- A file containing the supply tables created
- Detailed displays of the supply tables created
- A detailed display of trainee output and populations covering the number of weeks specified

Use

- The supply file is an input for the demand-supply comparison program (MMMDSMODL)
- Supply totals may be used by the casualty program (MMMCASPRG) to compute the non-theater exposed populations on which casualties are based

Options

Displays are optional.

```
C:    MMMSUPPRG       TRAINING/SUPPLY PROGRAM
C:
      STRING      DAY(27)(6), THETR(36), ENOF(8), THID(12), DATE(9)
      STRING      NAM(7)(7), IFN(15), FILID(15), NYN(3)
C:
      DIMENSION   SOUT(27,7), ACF(27), SLR(27), OTN(27), TRP(27), TRN(27)
      DIMENSION   NDYS(27), NFAC(27), NDX(27)
      DIMENSION   BINP(40), BAT(40), BOTP(40), AINP(40), TPOP(40), COTP(40)
      EQUIVALENCE (ACF,SOUT(1,3)), (SLR,SOUT(1,4)), (OTN,SOUT(1,5))
      EQUIVALENCE (TRP,SOUT(1,6)), (TRN,SOUT(1,7))
C:
      DATA    DAY/'PRE-M'
             ,'M','M+10','M+20','M+30','M+40','M+50','M+60','M+70','M+80'
             ,'M+90','M+100','M+110','M+120','M+130','M+140','M+150','M+160'
             ,'M+170','M+180','M+190'/
      DATA    NAM/'SUPPLY','TR POP','ACT F','SEL R','OTH I','T OUT','TRAINEE'/
      DATA    ISW/5/, ILM/27/, NBZZ/13/
C:
     1 FORMAT(//)
     2 FORMAT(6X,15('________')//)
    12 FORMAT(/I5,2X,S36,2X,S8,2X,S12,A6)
    18 FORMAT(//8X,S12,3X,S36,5X,S8)
    20 FORMAT(//10X,'TRAINING PROGRAM',I4,' WEEKS',14X,A9//)
    21 FORMAT(' TIME    BOOT BOOT   BOOT    BOOT    TO      TO    A-SCH  A-SCH    TOT'
             ,'     TOT     CUM'/' (WKS)  INPT  ATT  OTPT     POP    FLT  A-SCH'
             ,'    OTPT    POP     POP    OTPT    OTPT'//)
    22 FORMAT(I4,I8,I5,I6,I7,I6,4I7,I6,I7)
    30 FORMAT(/4X,S9,5X,S12,4X,S8,2X,S36/)
    32 FORMAT(/15X,14(2X,A6))
    34 FORMAT(//4X,S7,4X,14I8)
    35 FORMAT(/6X,S7,2X,14I8)
    36 FORMAT(/8X,S7,14I8)
C:
      WRITE (1,1)
      ACCEPT " RUN DATE = ", DATE, "     ID = ", FILID:        NWRT = 0
      ACCEPT " SUPPLY OUTPUT ? ", NYN;      IF (NYN.EQ.'N')   GO TO 120
      ACCEPT "          OUTPUT FILE = ",IFN;       NWRT = 1
      OPEN (4,IFN,OUTPUT,BINARY);          WRITE (4) FILID, DATE;   WRITE (1,2)
  120   NWRT2 = 0;      ACCEPT " SUPPLY TOTALS OUTPUT ? ", NYN
      IF (NYN.EQ.'N')   GO TO 140
      ACCEPT "    FILE = ", IFN;   OPEN (3,IFN,OUTPUT);   NWRT2 = 1
  140   NDX(1) = 1;      NFAC(1) = 1
      ACCEPT " SUPPLY DATA FILE = ",IFN;   OPEN (7,IFN)
C:
  150 DO 152  I=1,ILM
      DO 152  J=1,7
  152   SOUT(I,J) = 0
      READ (7,END=500) THID, THETR, ENOF, NPD:   IF (NPD.EQ.0)  GO TO 180
      READ (7,END=500)  (NDYS(N), N=2,NPD+1),  ACF(1)
        NFIL = NFIL + 1;      NPD = NPD + 1
      DO 158  N=2,NPD
        NDX(N) = 2 + NDYS(N)/10
  158   NFAC(N) = NDX(N) - NDX(N-1)
        ITP = NDX(NPD) - 1;      KPD = ILM - NPD
      WRITE (1,12)  NFIL, THETR, ENOF, THID, DAY(ITP+1)
C:
      READ (7)  NV;      IF (NV.GT.0)  READ (7)  (SLR(K), K=KPD+2,ILM)
```

```
      READ (7)  NV;      IF (NV.GT.0)  READ (7)  (OTN(K), K=KPD+2,ILM)
      READ (7)  NV;      IF (NV.GT.0)  READ (7)  (TRP(K), K=KPD+2,ILM)
      READ (7)  NV;      IF (NV.GT.0)  READ (7)  (TRN(K), K=KPD+2,ILM)
        NN = 0
      DO 162  KK=KPD+3,ILM
        K = ILM - NN;      NN = NN + 1
  162   TRN(K) = TRN(K) - TRN(K-1)
      CALL PSPRD (KPD,NPD,NDX,NFAC,SLR)
      CALL PSPRD (KPD,NPD,NDX,NFAC,OTN)
      CALL PSPRD (KPD,NPD,NDX,NFAC,TRP)
      CALL PSPRD (KPD,NPD,NDX,NFAC,TRN)
      DO 168  I=2,ITP+1
        ACF(I) = ACF(1);                SLR(I) = SLR(I) + SLR(I-1)
        TRP(I) = TRP(I) + TRP(I-1);     TRN(I) = TRN(I) + TRN(I-1)
  168   OTN(I) = OTN(I) + OTN(I-1)
      IF (ENOF.EQ.'OFFICERS')   GO TO 350
C:
  180 READ (7)  INTR;      IF (INTR.EQ.0)   GO TO 350
      READ (7)  LP, BINP(1), APOP, BPOP, COTP(1), ATT, APCT
               ,LB, LA, POPMAX, LF1, LF2, NWK, (BINP(N), N=3,NWK+2)
        ATT = ATT/100;      APCT = APCT/100;     FPCT = 1-APCT;      BPRN = 0
C:
      ACCEPT " COMPUTE TRAINING OUTPUT ? ", NYN
      IF (NYN.EQ.'N')   GO TO 350
      ACCEPT " PRINT DETAILED TRAINING OUTPUT ? ", NYN
      IF (NYN.EQ.'N')   GO TO 250
      ACCEPT ".",NYN;   BPRN = 1;   WRITE (1,18)  THID, THETR, ENOF
      WRITE (1,20) NWK, DATE;   WRITE (1,21)
C:
  250   LF = LF1
      IF (POPMAX.EQ.0)   POPMAX = 1E10
      IF (BINP(1).EQ.0)   BINP(1) = BPOP/(LP*(1-ATT))
        BAT(1) = ROUND (ATT*BINP(1));      BOTP(1) = BINP(1) - BAT(1)
        AINP(1) = APCT*BOTP(1);         TPOP(1) = APOP + BPOP
      DO 268  N=2,NWK+2
        BAT(N) = ROUND (ATT*BINP(N))
        BOTP(N) = BINP(MAX(N-LB,1)) - BAT(MAX(N-LB,1))
      IF (N.EQ.2)   BOTP(N) = (LP-LB) * (BINP(1)-BAT(1))
      IF (N-LB.EQ.2)   BOTP(N) = BINP(1) - BAT(1)
        BPOP = BPOP + BINP(N) - BOTP(N) - BAT(N)
      IF (BPOP.LE.POPMAX)   GO TO 264
        BINP(N) = BINP(N) - (BPOP-POPMAX)/(1-ATT)
        BAT(N) = ATT*BINP(N);      BPOP = POPMAX
  264 IF (N.GT.3)  LF = LF2
        FLT = FPCT*BOTP(MAX(N-LF,1));      AINP(N) = APCT*BOTP(N)
        AOPT = AINP(MAX(N-LA,1))
        APOP = APOP + AINP(N) - AOPT;      TPOP(N) = APOP + BPOP
        TOTP = AOPT + FLT;                 COTP(N) = COTP(N-1) + TOTP
      IF (BPRN.GT.0)  WRITE (1,22)  N-2, BINP(N), BAT(N), BOTP(N)
          ,BPOP, FLT, AINP(N), AOPT, APOP, TPOP(N), TOTP, COTP(N)
  268 CONTINUE
      WRITE (1,1);      ACCEPT ".", NYN
        TRP(1) = COTP(1);      TRN(1) = TPOP(1)
      CALL XTRP (NWK,COTP,TRP);      CALL XTRP (NWK,TPOP,TRN)
      GO TO 350
C:
  300 READ (7)  NV;      IF (NV.GT.0)  READ (7)  (SLR(K), K=KPD+2,ILM)
      READ (7)  NV;      IF (NV.GT.0)  READ (7)  (OTN(K), K=KPD+2,ILM)
      CALL PSPRD (KPD,NPD,NDX,NFAC,SLR)
      CALL PSPRD (KPD,NPD,NDX,NFAC,OTN)
      DO 328  I=2,ITP+1
```

```
        ACF(I) = ACF(1);                SLR(I) = SLR(I) + SLR(I-1)          44
  328   OTN(I) = OTN(I) + OTN(I-1)
C:
  350 DO 358  I=1,ITP+1
      DO 352  J=3,6
  352   SOUT(I,2) = SOUT(I,2) + SOUT(I,J)
  358   SOUT(I,1) = SOUT(I,2) + SOUT(I,7)
C:
  400 CONTINUE
      IF (NWRT2.EQ.1)   WRITE (3,40) DATE, THETR, ENOF, (SOUT(I,1), I=1,27)
   40 FORMAT(1X,'"',A9,'"',1X,'"',$36,'"',1X,'"',$8,'"',I12/(8X,7I10/) )
      IF (NWRT.EQ.1)  WRITE (4)  ISW, DATE, THID, THETR, ENOF, ITP, SOUT
C:
        NPD = 14
      DO 402  N=1,NPD
      IF (N.LT.12)  NDX(N) = N
      IF (N.GT.11)  NDX(N) = N + 2*(N-11)
  402 CONTINUE
      ACCEPT "    PRINT SUPPLY DETAIL ? ", NYN;    IF (NYN.EQ.'N')  GO TO 150
      ACCEPT "    STANDARD PRINT ? ", NYN;         IF (NYN.EQ.'Y')  GO TO 410
C:
      ACCEPT "    # OF PERIODS TO PRINT = ", NPD;      NPD = NPD + 1
      ACCEPT "    LIST PERIOD(S): ", (NDYS(N), N=2,NPD);    NDX(1) = 1
      DO 408  N=2,NPD
  408   NDX(N) = 2 + NDYS(N)/10
C:
  410 WRITE (1,2);          ACCEPT ".", NYN
        NT = 0;             WRITE (1,1)
  420   NB = NT + 1;        NT = MIN (NB+NBZZ,NPD)
      WRITE (1,30) DATE, THID, ENOF, THETR
      WRITE (1,32)  (DAY(NDX(N)), N=NB,NT)
      DO 428  J=1,7
      GO TO (424,425,426,426,426,426,425), J
  424 WRITE (1,34)  NAM(J), (SOUT(NDX(N),J), N=NB,NT);       GO TO 428
  425 WRITE (1,35)  NAM(J), (SOUT(NDX(N),J), N=NB,NT);       GO TO 428
  426 WRITE (1,36)  NAM(J), (SOUT(NDX(N),J), N=NB,NT)
  428 CONTINUE
      WRITE (1,2);      IF (NT.LT.NPD)   GO TO 420
      GO TO 150
C:
  500 CLOSE (7);  CLOSE (4);  CLOSE(3);  DISPLAY NFIL, " RECORD(S) PROCESSED"
      END



      SUBROUTINE XTRP (NWK,WK,PD)
      DIMENSION  WK(*), PD(*)
        PD(2) = WK(2);      I = 10
      DO 198  N=2,NWK+2
        K = 7 * (N-2) + 1
      IF (K+6-I)  198,150,110
  110 IF (K-I)    150,150,180
  150   BAS = WK(N);    TOP = WK(N+1);    FAC = (TOP-BAS)/7
        PD(2+I/10) = TOP - (K+6-I)*FAC
  180   I = I + 10
  198 CONTINUE
      END
      SUBROUTINE PSPRD (KPD,NPD,NDX,NFAC,FINP)
      DIMENSION   NDX(*), NFAC(*), FINP(*)
        M = 1
```

```
      DO 198  N=2,NPD
        FNUM = FINP(KPD+N)
  120   M = M + 1;      IF (M.EQ.NDX(N))   GO TO 190
        FINP(M) = FINP(KPD+N)/NFAC(N);     FNUM = FNUM - FINP(M);   GO TO 120
  190   FINP(M) = FNUM
  198 CONTINUE
      RETURN
      END
```

NUPOLPRG

Function

This program creates a file containing all the data associated with the policies utilized during a scenario's time frame.

Input

- The policy to be used in each time period
- The WIA & DNBI evacuation rates for each policy
- The WIA & DNBI mean RTD's for each policy

Output

A binary file containing:

- Time phased lists of policy identifiers and evacuation rates
- WIA & DNBI matrices of percentage RTD's for each time period
- Lists of daily percentage RTD's for each policy

Use

- Input to the casualty program (MMMCASPRG)
- Input to the hospital program (MMMHOSPRG)

Separate policy files are generated for theaters and non-theaters

```
      STRING   IFN(15), MFN(15), NFN(15), LFN(15), NYN(3)
      DIMENSION   RM(27,27), IN(27), SD(27), PROB(27)
      DIMENSION   MPLA(27), MPOL(26)
      DIMENSION   RWFV(3), RDEV(3), IRTD(3,2), RTDM(2,10)
      EQUIVALENCE (MPOL,MPLA(2))
C:
      DATA   ILM/27/, CN/.1/
C:
    1 FORMAT(//)
    6 FORMAT(2I3/26I3/6F7.3,4X,12I3)
C:
      WRITE (1,1)
      ACCEPT "  POLICY INPUT = ",IFN;      OPEN (3,IFN)
      READ (3)  NTH, RWFV, RDEV, JNUM, (RTDM(1,J),RTDM(2,J), J=1,JNUM)
C:
      READ (3)  NV;      NT = 0
      DO 168  N=1,NV
        NN = NT + 1
      READ (3)  NTO, IMPL;      NT = 2 + NTO/10
      DO 168  M=NN,NT
        MPLA(M) = IMPL
  168 CONTINUE
      READ (3)  IRTD;      CLOSE (3)
C:
      ACCEPT "  POLICY FILE = ", MFN;      OPEN (4,MFN,OUTPUT,BINARY)
C:C   ACCEPT "  POLICY FILE = ", MFN;      OPEN (4,MFN,OUTPUT)
        JNM = MIN (JNUM,6)
      WRITE (4)  NTH, JNM, MPOL, RWFV, RDEV, IRTD
C:C   WRITE (4,6)  NTH, JNM, MPOL, RWFV, RDEV, IRTD
C:
      DO 188  J=1,JNM
        M = RTDM(1,J);      S = RTDM(2,J);      CALL POLICY (1,1,M,S,PROB)
  188 CONTINUE
C:
      DO 248  K=1,2
      IF (MPLA(1).EQ.0)   GO TO 220
        M = RTDM(1,IRTD(MPLA(1),K));      S = RTDM(2,IRTD(MPLA(1),K))
      CALL POLICY (2,0,M,S,PROB)
      DO 208  J=2,ILM
  208   RM(1,J) = PROB(J-1)
C:
  220   M = 0
      DO 238  I=2,ILM
        ML = M
      IF (MPLA(I).EQ.0)   GO TO 238
        M = RTDM(1,IRTD(MPLA(I),K));      S = RTDM(2,IRTD(MPLA(I),K))
      IF (M.NE.ML)   CALL POLICY (2,1,M,S,PROB)
      DO 238  J=I,ILM
        RM(I,J) = PROB(J+1-I)
  238 CONTINUE
      CALL PUTRMB (RM,ILM)
  248 CONTINUE
C:
      IF (JNM.EQ.JNUM)   GO TO 298
        M = RTDM(1,JNM+1);      S = RTDM(2,JNM+1);      IF (M.EQ.0)  GO TO 270
      CALL POLICY (2,0,M,S,PROB)
      DO 258  J=2,ILM
  258   RM(1,J) = PROB(J-1)
C:
```

```
  270   M = RTDM(1,JNM+2);      S = RTDM(2,JNM+2);      IF (M.EQ.0)  GO TO 280
        CALL POLICY (2,1,M,S,PROB)
        DO 272  I=2,ILM
        DO 272  J=I,ILM
  272   RM(I,J) = PROB(J+1-I)
  280 CALL PUTRMB (RM,ILM)
  298 CLOSE (4)
        END
        SUBROUTINE PUTRMB (RM,ILM)
        DIMENSION   RM(*,*), RMAT(378)
C:
   10 FORMAT(I3,9F7.4,17X,9F7.4,17X,9F7.4)
C:
        DO 298  I=1,ILM
        DO 298  J=1,I
  298   RMAT(I*(I-1)/2 + J) = RM(J,I)
        WRITE (4)  RMAT
        RETURN
        END
C:
        SUBROUTINE POLICY (LSW,ISW,MM,S,PROB)
        DIMENSION PR(270), P(270), PROB(*)
          M = MM + 1
          IDL = MIN(M-1,4*S) + 1;      IB = M-IDL;      PTOT = 0;  PTOT2 = 0
        DO 205  I=1,IDL
          P(I) = PFN((IDL-I+.5)/S) - PFN((IDL-I-.5)/S)
          IF (I.LT.IDL)   P(2*IDL-I) = P(I)
  205   PTOT = PTOT + 2*P(I)
        PTOT = PTOT - P(IDL)
        IF (LSW.EQ.2)   GO TO 220
        CALL DISPL (M,IDL,IB,P);      RETURN
C:
  220 IF (ISW.EQ.1)   GO TO 230
        IB = 0;   LT = 2*(IDL-1)
        DO 228  J=1,2*(IDL-1)
          PR(J) = 0
        DO 226  K=J+1,2*IDL-1
  226   PR(J) = PR(J) + P(K)
  228   PTOT2 = PTOT2 + PR(J)
        GO TO 250
C:
  230 DO 238  J=1,2*IDL+8
        JB = MAX (1,J-9);      PR(IB+J) = 0;      JT = MIN(J,IDL+4)
        IF (J.GT.IDL+4)      GO TO 234
        DO 232  K=JB,JT
  232   PR(IB+J) = PR(IB+J) + P(K)
        GO TO 238
  234   PR(IB+J) = PR(IB+2*IDL+9-J)
  238   PTOT2 = PTOT2 + PR(IB+J)
        LT = IB + 2*IDL + 8
C:
  250   PTOT = 0
C:      DISPLAY  PTOT2, IB+1, (PR(IB+J), J=1,2*IDL+8);   DISPLAY / /
        DO 258  L=1,LT,10
          LR = 1+L/10;      PROB(LR) = 0
        IF (L+9.LE.IB)      GO TO 258
          KT = MIN (L+9,LT);      KB = MAX (L,IB+1)
        DO 252  K=KB,KT
  252   PROB(LR) = PROB(LR) + PR(K)
        PROB(LR) = PROB(LR) / PTOT2
        PTOT = PTOT + PROB(LR)
```

```
  258 CONTINUE
      DO 262  L=LR+1,27
  262   PROB(L) = 0
C:      DISPLAY ' ', PTOT;  DISPLAY ' '
      RETURN
      END
      FUNCTION PFN (X)
        AX=ABS(X)
        T=1.0/(1.0+.2316419*AX)
        D=0.3989423*EXP(-X*X/2.0)
      P=1.0-D*T*((((1.330274*T-1.821256)*T+1.781478)*T-0.3565638)*T+0.3193815)
        PFN = P;      IF (X.LT.0)   PFN = 1.0-P
      RETURN
      END
      SUBROUTINE DISPL (M,IDL,IB,PR)
      DIMENSION   PR(*), P(270)
   10 FORMAT(4I6/)
   20 FORMAT(10F8.4)
        JT = 2*(IDL-1)
         P(1) = PR(1)
      DO 112  J=2,JT
  112    P(J) = PR(J) + P(J-1)
      WRITE (4)  IB+1, JT+2, 0.0, (P(J), J=1,JT), 1.0
C:C   WRITE (4,10)  IB+1, JT+2
C:C   WRITE (4,20)   0.0, (P(J), J=1,JT), 1.0
      RETURN
      END
      SUBROUTINE PUTRM (RM,ILM)
      DIMENSION   RM(*,*)
C:
   10 FORMAT(I3,9F7.4,17X,9F7.4,17X,9F7.4)
C:
      DO 298  I=2,ILM
        NN = -1
      DO 278  J=1,I
      IF (RM(J,I).EQ.0)   GO TO 278
      IF (NN.LT.0)        NN = J - 1
        NT = J
  278 CONTINUE
        ZN = I + CN
      IF (NN.GE.0)   GO TO 290
        NN = I - 1;    NT = I
  290 WRITE (4,10)   NN, (RM(J,I), J=NN+1,I)
  298 CONTINUE
      DO 302  I=1,ILM
      DO 302  J=1,ILM
  302   RM(I,J) = 0.0
        CN = CN + .1
      END
```

WMPREPROC

Function

This program creates a file containing a data set for each theater described.

Input

- Theater ID, TITLE, TYPE (OFFICER or ENLISTED)
- PRE-M population and patient pool
- Population by time period
- Personnel killed in action, and/or wounded in action and billet losses for each time period in which they occur
- WIA & DNBI evacuation delays
- Casualty replacement delay
- KIA, WIA, DNBI, DOW, DISCHARGE rates for specified time periods

Output

A data set for each set of inputs

Use

Input to the casualty program (MMMCASPRG)

WMPREPROC

```
C:    WMPREPROC   PROCESSES RAW INPUT DATA FOR CASUALTY MODEL
C:
      STRING      DAY(27)(6), IFN(15), MFN(15), PFN(15)
      STRING      THETR(36), ENOF(8), THID(12), DATE(9), FILID(15)
      DIMENSION   NDX(27), NFAC(26), NDYS(27)
      DIMENSION   POUT(26,6), POP(26), PINC(26), TL1(26), TL2(26), BIL(26)
      DIMENSION   RPP(26,3), RDW(26,3), DIS(3), DIE(3)
C:
      EQUIVALENCE (PINC,POUT), (TL1,POUT(1,2)), (TL2,POUT(1,3))
      EQUIVALENCE (BIL,POUT(1,4)), (RDW,POUT(1,4))
      DATA   DAY/'PRE-M'
     ,'M','M+10','M+20','M+30','M+40','M+50','M+60','M+70','M+80'
     ,'M+90','M+100','M+110','M+120','M+130','M+140','M+150','M+160'
     ,'M+170','M+180','M+190','M+200','M+210','M+220','M+230','M+240'/
      DATA   DAY(27)/'M+250'/
      DATA   NFAC/26*1/,  ILM/27/
C:
    2 FORMAT(/12X,7('_________'))
   10 FORMAT(///3X,'RECORD #',20X,'THEATER',28X,'ID',2X,'LAST DAY'/)
   12 FORMAT(I8,1X,S36,1X,S8,2X,A12,4X,A6)
   18 FORMAT(//3X,S15,':',1X,S15,I4,' RECORDS',2X,S9///)
   40 FORMAT(2I2,S9,S12,S42,I4/2X,2I8,3I4,F4.1)
   42 FORMAT(4(2X,9I8/2X,9I8/10X,8I8))
   44 FORMAT(6(2X,9F8.5/2X,9F8.5/10X,8F8.5))
C:
      WRITE (1,2)
      ACCEPT " PRE-PROCESS RUNDATE = ", DATE
      ACCEPT " OUTPUT DATA FILE = ", MFN, "  ID = ", FILID
      OPEN (4,MFN,OUTPUT,BINARY);          WRITE (4)  FILID, DATE
      ACCEPT " INPUT DATA FILE = ", IFN;   OPEN (7,IFN)
C:
      WRITE (1,10)
  100 DO 102  I=1,ILM-1
        POP(I) = 0
      DO 102  N=1,6
  102   POUT(I,N) = 0
C:
        K = 0;   READ (7,END=900) ISW, THID,THETR,ENOF, NPD, (NDYS(N), N=1,NPD)
      DO 138  N=1,NPD
        NDX(N) = 1 + NDYS(N)/10;      NFAC(N) = NDX(N) - K
  138   K = NDX(N)
        ITP = NDX(NPD);      KPD = ILM - NPD
      READ (7)  MDW, MDD, IDL, PATO, PREM, AV
      READ (7) NV;      IF (NV.GT.0)   READ (7)  (POP(K), K=KPD,ILM-1)
      READ (7) NV;      IF (NV.GT.0)   READ (7)  (TL1(K), K=KPD,ILM-1)
      IF (ISW.EQ.1)   GO TO 150
      READ (7)  NV;     IF (NV.GT.0)  READ (7)  (TL2(K), K=KPD,ILM-1)
      READ (7)  NV;     IF (NV.GT.0)  READ (7)  (BIL(K), K=KPD,ILM-1)
C:
  150   PINC(KPD) = POP(KPD) - PREM
      DO 158  K=KPD+1,ILM-1
        PINC(K) = POP(K) - POP(K-1)
  158   POP(K-1) = 0
        KPD = KPD - 1
      CALL PSPRD (KPD,NPD,NDX,NFAC,PINC)
```

```
      WMPREPROC

      CALL PSPRD (KPD,NPD,NDX,NFAC,TL1)
      IF (ISW.EQ.1)   GO TO 190
      CALL PSPRD (KPD,NPD,NDX,NFAC,TL2)
      CALL PSPRD (KPD,NPD,NDX,NFAC,BIL)
C:
      READ (7)  NV;      NT = 0
      DO 188  N=1,NV
        NN = NT + 1
      READ (7)  NTO, RPK, RPW, RPD, EDW
        NT = 1 + NTO/10
      DO 188 M=NN,NT
        RPP(M,1) = RPK;   RPP(M,2) = RPW;   RPP(M,3) = RPD
  188   RDW(M,3) = EDW
      GO TO 400
C:
  190 READ (7)  NV;      NT = 0
      DO 198  N=1,NV
        NN = NT + 1;   READ (7)  NTO, RPD, DIE, DIS;   NT = 1 + NTO/10
      DO 198  M=NN,NT
        TL2(M) = RPD
      DO 198  K=1,3
        RDW(M,K) = DIE(K)
  198   RPP(M,K) = DIS(K)
C:
  400 IF (ITP.GE.ILM-1)   GO TO 410
      DO 408  J=1,6
      DO 408  I=ITP+1,ILM-1
  408   POUT(I,J) = 0
  410   NFIL = NFIL + 1
      WRITE (1,12)  NFIL, THETR, ENOF, THID, DAY(ITP+1)
      WRITE (4)  ISW, IZER, DATE, THID, THETR, ENOF, ITP, PATO, PREM
                    ,MDW, MDD, IDLY, AV
      WRITE (4)  POUT, RPP
      GO TO 100
  900 WRITE (1,18)  MFN, FILID, NFIL, DATE;      CLOSE(7);      CLOSE (4)
      WRITE (1,2)
      END
      SUBROUTINE PSPRD (KPD,NPD,NDX,NFAC,FINP)
      DIMENSION   NDX(*), NFAC(*), FINP(*)
        M = 0
      DO 198  N=1,NPD
        FNUM = FINP(KPD+N)
  120   M = M + 1;      IF (M.EQ.NDX(N))   GO TO 190
        FINP(M) = FINP(KPD+N)/NFAC(N);    FNUM = FNUM - FINP(M);   GO TO 120
  190   FINP(M) = FNUM
  198 CONTINUE
      RETURN
      END
```

MMMCASPRG

Function

Computes time phased casualty and replacement data for each theater and non-theater data set.

Input

- Pre-processed data set files
- Policy file(s) - applicable to each data set
- Supply file (non-theater only) - optional

Output

A file containing casualty tables for each data set selected.

Use

- Input to the printing/aggregating program (MMMPRNPRG)
- Input to the demand program (MMMDEMPRG)

Options

- Selection of specific data sets from the input file - used for specifying which theaters contribute their evacuees to a particular non-theater

MMMCASPRG

```
C:    MMMCASPRG       MMM CASUALTY MODEL
C:
      STRING       DAY(27)(6), THETR(36), ENOF(8), THID(12), FILID(15)
      STRING       DATE(9), RUNDATE(9),  MFN(15), LFN(15), PFN(15)
      STRING       THSUP(36), ENSUP(8), INID(15), INDATE(9)
C:
      DIMENSION    MPOL(26), PINC(26), TLOS(40),  POUT(27,17)
      DIMENSION    POP(26), GPP(27), TLP(26), TL1(26), TL2(26), BIL(26)
      DIMENSION    WKA(26), WIA(26), DNB(26), DOW(26), RTD(26), PAT(26)
      DIMENSION    WEV(26), WHP(26), DEV(26), DHP(26)
C:
      DIMENSION    CWIA(26,3), CDIS(26,3), HSP(27,3),RPD(26),  CDOW(3)
      DIMENSION    HS1(27), HS2(27), HS3(27),  RP1(26), RP2(26), RP3(26)
      DIMENSION    RM(1134), RM1(378), RM2(378), RM3(378)
      DIMENSION    RDW1(26,3), RDW2(26,3), RDW(26),  RWEV(3), RDEV(3), IDUM(6)
      DIMENSION    MDLY(3), FDLY(3),  INLST(12), IDO(12), FRT(200)
C:
      EQUIVALENCE (POP,POUT(2,1)), (GPP,POUT(1,2)), (TLP,POUT(2,3))
                 ,(TL1,POUT(2,4)), (TL2,POUT(2,5)), (BIL,POUT(2,6))
                 ,(WKA,POUT(2,7)), (WIA,POUT(2,8)), (WEV,POUT(2,9))
      EQUIVALENCE (WHP,POUT(2,10)), (DNB,POUT(2,11)), (DEV,POUT(2,12))
                 ,(DHP,POUT(2,13)), (DOW,POUT(2,14)), (RTD,POUT(2,15))
                 ,(PAT,POUT(2,16)), (TLOS,POUT(2,17))
      EQUIVALENCE (HS1,HSP), (HS2,HSP(1,2)), (HS3,HSP(1,3))
      EQUIVALENCE (RDW,RDW1), (RPD,BIL)
      EQUIVALENCE (RP1,RDW2), (RP2,RDW2(1,2)), (RP3,RDW2(1,3))
      EQUIVALENCE (PREM,POUT),  (PATO,POUT(1,16)),  (FRT,RM)
      EQUIVALENCE (RM1,RM), (RM2,RM(379)), (RM3,RM(757))
C:
      DATA   DAY/'PRE-M'
            ,'M','M+10','M+20','M+30','M+40','M+50','M+60','M+70','M+80'
            ,'M+90','M+100','M+110','M+120','M+130','M+140','M+150','M+160'
            ,'M+170','M+180','M+190'/
      DATA   ILM/27/, ISW/-1/
C:
    2 FORMAT(/14X,8('_________'))
    4 FORMAT(14X,8('---------'))
    6 FORMAT(///)
    7 FORMAT(15X,S12,2X,S9/)
   12 FORMAT(/I8,1X,S36,1X,S8,2X,S12,2X,A9)
   18 FORMAT(//10X,S15,':',1X,S15,I4,' RECORDS',2X,S9///)
C:
      WRITE (1,6)
      ACCEPT " CASUALTY RUN DATE = ", RUNDATE
      ACCEPT " CASUALTY FILE(OUTPUT) = ", LFN, "  ID = ", FILID
      OPEN (4,LFN,OUTPUT,BINARY);       WRITE (4)  FILID, RUNDATE;    DISPLAY " "
      ACCEPT "  INPUT FILE = ", MFN;    OPEN (7,MFN,INPUT,BINARY)
      READ (7)  INID, DATE;             WRITE (1,7)  INID, DATE;      WRITE (1,2)
      ACCEPT "    # OF RECORDS TO PROCESS = ", NUMR
      ACCEPT "    REC'D #S = ",  (INLST(N), N=1,NUMR)
      DO 108  N=1,NUMR
  108   IDO(INLST(N)) = 1
C:
  150   LSW = ISW
  160 READ (7,END=900)  ISW,LTYP,DATE,THID,THETR,ENOF,ITP,PATO,PREM
                       ,MDW,MDD,IDLY,AV
        NREC = NREC + 1
```

```
      MMMCASPRG

      IF (ISW.EQ.0)  READ (7)  PINC, TL1,TL2, BIL, RDW,RDW, RDW2
      IF (ISW.EQ.1)  READ (7)  PINC, TLP, RPD, RDW1, RDW2
      IF (IDO(NREC).EQ.0)   GO TO 160
        KREC = KREC + 1
      WRITE (1,12)  NREC, THETR, ENOF, THID, DATE
      IF (ISW.EQ.LSW)   GO TO (300,500), ISW+1
  170 ACCEPT "    POLICY FILE = ", PFN;   OPEN (3,PFN,INPUT,BINARY)
      READ (3)  JSW, JNUM;      IF (JSW.EQ.ISW)   GO TO 172
      DISPLAY "       WRONG POLICY FILE";   GO TO 170
  172 READ (3)  MPOL, RWEV, RDEV, IDUM
      DO 176  J=1,JNUM
  176 READ (3)  KB, KT, (FRT(K), K=1,KT)
      READ (3)  RM1, RM2;      IF (JSW.EQ.1)  READ (3)  RM3
      CLOSE (3);      GO TO (300,500), ISW+1
C:
C:            COMPUTE THEATER
  300   MDLY(1) = TRUNC(MDW/10.0);   FDLY(1) = FRACT(MDW/10.0)
        MDLY(2) = TRUNC(MDD/10.0);   FDLY(2) = FRACT(MDD/10.0)
        HS2(1) = PATO;      POP(1) = PREM + PINC(1);      GPP(1) = PREM
      DO 358  I=1,ITP
        RPF = 5 * (RP1(I)+RP2(I)+RP3(I))
        TLP(I) = TL1(I) + TL2(I)
      IF (I.GT.1)     POP(I) = POP(I-1) + PINC(I)
        GPP(I+1) = POP(I);       IF (IDLY.EQ.0)   GO TO 320
        GPP(I+1) = (1.-RPF)*GPP(I) + PINC(I) - TLP(I)
      IF (I.GT.IDLY)   GPP(I+1) = GPP(I+1) + RTD(I-IDLY) + TLOS(I-IDLY)
        GPP(I+1) = GPP(I+1)/(1.+RPF)
  320   TMP = 10*(1.-AV)*GPP(I) + 10*AV*GPP(I+1)
      IF (I.EQ.1)    TMP = POP(I) + 9*GPP(I)
        WKA(I) = RP1(I)*TMP + TL1(I)
        WIA(I) = RP2(I)*TMP + TL2(I);     DNB(I) = RP3(I)*TMP
      IF (I+MDLY(1)-ITP)  322,324,330
  322   WEV(I+1+MDLY(1)) = WEV(I+1+MDLY(1)) + RWEV(MPOL(I))*WIA(I)*FDLY(1)
  324   WEV(I+MDLY(1)) = WEV(I+MDLY(1)) + RWEV(MPOL(I))*WIA(I)*(1.-FDLY(1))
  330 IF (I+MDLY(2)-ITP)  332,334,340
  332   DEV(I+1+MDLY(2)) = DEV(I+1+MDLY(2)) + RDEV(MPOL(I))*DNB(I)*FDLY(2)
  334   DEV(I+MDLY(2)) = DEV(I+MDLY(2)) + RDEV(MPOL(I))*DNB(I)*(1.-FDLY(2))
  340   WHP(I) = WIA(I) - WEV(I);      DHP(I) = DNB(I) - DEV(I)
        CDW = RDW(I) * (1.-RWEV(MPOL(I))) * WIA(I)
        HS1(I+1) = (1.-RWEV(MPOL(I)))*WIA(I) - CDW
        DOW(I) = CDW
C:      CDW = RDW(I) * (1.-RDEV(MPOL(I))) * DNB(I)
        HS2(I+1) = (1.-RDEV(MPOL(I)))*DNB(I)
C:      DOW(I) = DOW(I) + CDW
C:
C:            PUT EVACS IN CONUS
        CWIA(I,1) = CWIA(I,1) + WEV(I);   CWIA(I,2) = CWIA(I,2) + DEV(I)
        CWIA(I,3) = CWIA(I,3) + POP(I)
C:
      DO 352  J=1,I+1
        IX = I*(I+1)/2 + J
  352   RTD(I) = RTD(I) + HS1(J)*RM1(IX) + HS2(J)*RM2(IX)
        PAT(I) = WHP(I) + DHP(I) - DOW(I) - RTD(I)
        PAT(I) = PAT(I) + POUT(I,16)
        TLOS(I) = WKA(I) + WIA(I) + DNB(I) - RTD(I)
C:    IF (I.EQ.1.AND.IDLY.NE.0)   GPP(I+1) = POP(I)-WKA(I)-WIA(I)-DNB(I)
  358 CONTINUE
        TPREM = TPREM + PREM
C:
  400 WRITE (4)  ISW, DATE, THID, THETR, ENOF, ITP, MDW, MDD, IDLY, POUT
C:
```

```
      DO 462  I=1,ILM
      DO 462  J=1,17
  462   POUT(I,J) = 0
      IF (KREC.LT.NUMR)   GO TO 150
      GO TO 900
C:
  500 ACCEPT "    EVACUEE FILE = ", PFN;    IF (PFN.EQ.'N')   GO TO 510
      OPEN (3,PFN);      LL = 0;      GO TO 504
  502 CLOSE (3);      GO TO 500
  504 READ (3,END=502) INDATE, THSUP, ENSUP, TPREM, CWIA;      LL = LL + 1
      WRITE (1,12) LL, THSUP, ENSUP, INDATE;     IF (ENSUP.NE.ENOF)  GO TO 504
      CLOSE (3)
  510 ACCEPT "    SUPPLY FILE = ", PFN;     IF (PFN.EQ.'N')   GO TO 530
      OPEN (3,PFN);      LL = 0;      GO TO 514
  512 CLOSE (3);      GO TO 510
  514 READ (3,END=512) INDATE, THSUP, ENSUP, PSUP, TL2;      LL = LL + 1
      WRITE (1,12) LL, THSUP, ENSUP, INDATE;     IF (ENSUP.NE.ENOF)  GO TO 514
      CLOSE (3)
      POUT(1,4) = PREM;    TL1(1) = PREM+PINC(1)
      PREM = PSUP - TPREM;    PINC(1) = TL2(1) - CWIA(1,3) - PREM
      DO 518  I=2,ILM-1
        TL1(I) = PINC(I) + TL1(I-1)
  518   PINC(I) = (TL2(I)-CWIA(I,3)) - (TL2(I-1)-CWIA(I-1,3))
C:
C:              COMPUTE CONUS
  530   MDLY(1) = TRUNC(MDW/10.0);    FDLY(1) = FRACT(MDW/10.0)
        MDLY(2) = TRUNC(MDD/10.0);    FDLY(2) = FRACT(MDD/10.0)
        MDLY(3) = TRUNC(IDLY/10.0);   FDLY(3) = FRACT(IDLY/10.0)
        HS2(1) = 0;      HS3(1) = PAT0;      POP(1) = PREM + PINC(1)
        GPP(1) = MAX (PREM,0)
      DO 558  I=1,ITP
      IF (I.GT.1)    POP(I) = POP(I-1) + PINC(I)
        GPP(I+1) = MAX (POP(I),0)
        TMP = 10*(1.-AV)*GPP(I) + 10*AV*GPP(I+1)
      IF (I.EQ.1)    TMP = POP(I) + 9*GPP(I)
        CWIA(I,3) = RPD(I)*TMP + TLP(I)
      DO 548  J=1,3
        TMP = RDW2(I,J) * CWIA(I,J)
      IF (I+MDLY(J)-ITP)  542,544,546
  542   CDIS(I+1+MDLY(J),J) = CDIS(I+1+MDLY(J),J) + TMP*FDLY(J)
  544   CDIS(I+MDLY(J),J) = CDIS(I+MDLY(J),J) + TMP*(1.-FDLY(J))
  546   CDOW(J) = RDW1(I,J) * CWIA(I,J)
        HSP(I+1,J) = CWIA(I,J) - CDOW(J) - CDIS(I,J)
  548   DOW(I) = DOW(I) + CDOW(J) + CDIS(I,J)
        WIA(I) = CWIA(I,1);      DEV(I) = CWIA(I,2)
        DHP(I) = CWIA(I,3);      DNB(I) = DEV(I) + DHP(I)
      DO 552  J=1,I+1
        IX = I*(I+1)/2 + J;      RTD(I) = RTD(I) + HS1(J)*RM1(IX)
  552   RTD(I) = RTD(I) + HS2(J)*RM2(IX) + HS3(J)*RM3(IX)
        PAT(I) = HS1(I+1) + HS2(I+1) + HS3(I+1) - RTD(I)
        PAT(I) = PAT(I) + POUT(I,16)
        TLOS(I) = CWIA(I,3) - RTD(I)
  558 CONTINUE
      GO TO 400
C:
  900 CLOSE (7);   CLOSE (4)
      WRITE (1,18)  LFN, FILID, KREC, RUNDATE;      WRITE (1,2)
      END
```

MMMPRNPRG

Functions

- Print casualty tables
- Print and store aggregates of casualty tables
- Create and print hospital data files

Input

- Casualty files created by MMMCASPRG
- Casualty files previously created by this program
- Hospital files previously created by this program

Output

All output is optional.

- Casualty tables printed for any designated time periods
- Specified aggregates of casualty tables:
    - Printed for any designated time periods
    - Stored as files
- Hospital data printed for any designated time periods
- Specified aggregates of hospital data sets:
    - Printed for any designated time periods
- Hospital data file

Use

Casualty tables can be aggregated to the level of detail desired for the demand program (MMMDEMPRG), thus reducing storage requirements.

Hospital data files are input for the medical requirements program (MMMHOSPRG).

```
      MMMPRNPRG

C:    MMMPRNPRG     PRINTS/SUMS THEATER/NON-THEATER CASUALTY OUTPUT
C:
      COMMON   NDX(27), NDYS(27), IDO(12,2)
      COMMON   NPD, MDW, MDD, IDLY, DAY, THETR, ENOF, THID, DATE, NYN
      COMMON   NCON, NFIL, RUNDATE, RNID
C:
      STRING   DAY(27)(6), THETR(36), ENOF(8), THID(12), DATE(9), NYN(3)
      STRING   MFN(15), FILID(15), FILDATE(9), RUNDATE(9), RNID(12)
      STRING   ENOF1(8), ENOF2(8), NCON(3,12)(3)
      DIMENSION   PINP(27,17), POUT(27,17), CWIA(27,3), INLST(12)
      DIMENSION   CWIN(27,3)
C:
      DATA   DAY/'PRE-M'
             ,'M',  'M+10', 'M+20', 'M+30', 'M+40', 'M+50', 'M+60', 'M+70', 'M+80'
             ,'M+90', 'M+100', 'M+110', 'M+120', 'M+130', 'M+140', 'M+150', 'M+160'
             ,'M+170', 'M+180', 'M+190', 'M+200', 'M+210', 'M+220', 'M+230', 'M+240'/
      DATA   DAY(27)/'M+250'/
      DATA   ILM/27/,  ENOF1/' '/, ENOF2/' '/
C:
    1 FORMAT(///)
    2 FORMAT(/12X,8('_________'))
    3 FORMAT(/12X,8('_________'),$)
    7 FORMAT(15X,S12,2X,A9)
   12 FORMAT(/I6,1X,S36,1X,S8,2X,S12,2X,A6,$)
   40 FORMAT(1X,'"',A9,'"',1X,'"',S36,'"',1X,'"',S8,'"',I12/(8X,7I10/) )
C:
      WRITE (1,1);      ACCEPT " RUN DATE = ", RUNDATE, "       ID = ", RNID
      WRITE (1,2);      NOHSP = 0;      LSW = -1
      ACCEPT "   SAVE HOSP DATA ? ", NYN;    IF (NYN.EQ.'N')   GO TO 120
      ACCEPT "   HOSP FILE = ", MFN:          OPEN (4,MFN,OUTPUT,BINARY)
        NOHSP = 1
  120   FILID = ' ';    FILDATE = ' ';      ISUM = 0;    IHSP = 0
      ACCEPT "  INPUT FILE = ", MFN;    OPEN (7,MFN,INPUT,BINARY)
      ACCEPT "      CASUALTY FILE ? ", NYN
      IF (NYN.EQ.'Y')   READ (7)  FILID, FILDATE
      WRITE (1,7)  FILID, FILDATE;  DISPLAY" "
      DO 122  N=1,12
  122   IDO(N,1) = 0
      ACCEPT "     # OF RECORDS TO PROCESS = ", NUMR
      IF (NUMR.GT.0)  GO TO 126
        NUMR = -NUMR;     ACCEPT "     (TP,HP,SP) ", (NCON(I,1), I=1,3)
        IDO(1,1) = 1;      IDO(1,2) = 1
      DO 124  N=2,NUMR
      DO 124  I=1,3
        NCON(I,N) = NCON(I,1)
        IDO(N,1) = 1
  124   IDO(N,2) = 1
      GO TO 130
  126 ACCEPT "    LIST(#,TP,HP,SP): ", (INLST(N), (NCON(I,N), I=1,3), N=1,NUMR)
      DO 128  N=1,NUMR
        IDO(INLST(N),2) = N
  128   IDO(INLST(N),1) = 1
  130 DISPLAY " ";    MSUM = 0;    MEVC = 0
      ACCEPT "  SUM TABLES ? ", NYN;     IF (NYN.EQ.'Y')  MSUM = 1
      ACCEPT "  SUM WOUNDED ? ", NYN;    IF (NYN.EQ.'Y')  MEVC = 1
      WRITE (1,2);      NFIL = 0;      NREC = 0;      ACCEPT ".", NYN
C:
```

```
  150 READ (7,END=300) ISW,DATE,THID,THETR,ENOF,ITP,MDW,MDD,IDLY
      IF (ISW.LT.4)   READ (7)  PINP
      IF (ISW.GT.3)   READ (7)  CWIN
        NFIL = NFIL + 1;      IF (IDO(NFIL,1).EQ.0)   GO TO 150
      WRITE (1,12)  NFIL, THETR, ENOF, THID, DAY(ITP+1);      NREC = NREC + 1
      IF (ISW.EQ.2.OR.ISW.EQ.3)  ISUM = ISUM + MDD - 1
      IF (ISW.GT.3)              IHSP = IHSP + MDD - 1
      IF (ISW.GT.3)              IHSP1 = MDD
      IF (ENOF1.EQ.' ')  ENOF1 = ENOF
      IF (ENOF.EQ.ENOF1)  GO TO 152
      IF (ENOF2.EQ.' ')   ENOF2 = ENOF
  152 IF (LSW.LT.0)   LSW = ISW
      IF (ISW.GT.3)   GO TO 180
      DO 154  I=1,ILM
        CWIN(I,1) = PINP(I,8);      CWIN(I,2) = PINP(I,11)
  154   CWIN(I,3) = PINP(I,14)
        IHSP1 = 1
      IF (MSUM.EQ.0)   GO TO 170
      IF (MOD(ISW,2).NE.MOD(LSW,2))   GO TO 170
C:
      DO 168  J=1,17
      DO 168  I=1,ITP+1
  168   POUT(I,J) = POUT(I,J) + PINP(I,J)
        ISUM = ISUM + 1;    ISMAX = MAX (ISMAX,ITP)
  170 IF (NCON(1,IDO(NFIL,2)).EQ.'Y')   CALL SOPRNT (ISW,DATE,PINP)
C:
  180 IF (MEVC.EQ.0)   GO TO 190
      IF (MOD(ISW,2).NE.MOD(LSW,2))   GO TO 190
      DO 182  I=1,ITP+1
      DO 182  J=1,3
  182   CWIA(I,J) = CWIA(I,J) + CWIN(I,J)
        IHSP = IHSP + IHSP1;      IHMAX = MAX (IHMAX,ITP)
  190 IF (NOHSP.EQ.0)   GO TO 192
      WRITE (4)  ISW+4, DATE, THID, THETR, ENOF, ITP, 0, IHSP1, NFIL, CWIN
  192 IF (NCON(2,IDO(NFIL,2)).EQ.'Y')   CALL SOPRNT (MOD(ISW,2)+4,DATE,CWIN)
      IF (NREC.LT.NUMR)   GO TO 150
  300 CLOSE (7)
      ACCEPT "   ANOTHER INPUT FILE ? ", NYN;    IF (NYN.EQ.'Y')  GO TO 120
C:
        LSW = MOD(LSW,2)
        NFIL = 0;  IF (ENOF2.NE.' ') ENOF = LEFT(ENOF1,3) + '&' + LEFT(ENOF2,3)
      WRITE (1,1);      IF (ISUM.EQ.0)   GO TO 350
      ACCEPT "     TABLE SUMMARY THEATER = ", THETR, "     ID = ", THID
      IF (LSW.EQ.1)   GO TO 310
      ACCEPT "   SAVE EVAC DATA ? ", NYN;        IF (NYN.EQ.'N')   GO TO 310
        MFN = 'MMMEVAC' + ENOF;                  OPEN (3,MFN,OUTPUT)
      WRITE (3,40) RUNDATE, THETR, ENOF, POUT(1,1), (POUT(I,9), I=2,27)
                  ,(POUT(I,12), I=2,27), (POUT(I,1), I=2,27);      CLOSE (3)
  310 ACCEPT "   SAVE TABLE SUMMARY ? ", NYN;    IF (NYN.EQ.'N')   GO TO 320
      ACCEPT "   FILE NAME = ", MFN, "     FILE ID = ", FILID
      OPEN (3,MFN,OUTPUT,BINARY);      WRITE (3)  FILID, RUNDATE
      WRITE (3)  LSW+2, RUNDATE, THID, THETR, ENOF, ISMAX, 0, ISUM, 0, POUT
      CLOSE (3)
  320 ACCEPT "   PRINT TABLE SUMMARY ? ", NYN
      IF (NYN.EQ.'Y')   CALL SOPRNT (LSW+2,RUNDATE,POUT)
C:
  350 IF (IHSP.EQ.0)   GO TO 900
      ACCEPT "     HOSP SUMMARY THEATER = ", THETR, "     ID = ", THID
      ACCEPT "   SAVE HOSP SUMMARY ? ", NYN;    IF (NYN.EQ.'N')   GO TO 370
      IF (NOHSP.EQ.1)   GO TO 360
      ACCEPT "   HOSP FILE NAME = ", MFN;       OPEN (4,MFN,OUTPUT,BINARY)
```

```
  360 WRITE (4)  LSW+4, RUNDATE, THID, THETR, ENOF, IHMAX, 0, IHSP, 0, CWIA
      CLOSE (4)
  370 ACCEPT "   PRINT HOSP SUMMARY ? ", NYN
      IF (NYN.EQ.'Y')   CALL SOPRNT (LSW+4,RUNDATE,CWIA)
  900 WRITE (1,2)
      END


      SUBROUTINE SOPRNT (NSW,PRNDATE,POUT)
      COMMON   NDX(27), NDYS(27), IDO(12,2)
      COMMON   NPD, MDW, MDD, IDLY, DAY, THETR, ENOF, THID, DATE, NYN
      COMMON   NCON, NFIL
C:
      DIMENSION   POUT(*,*)
      STRING   DAY(27)(6), THETR(36), THID(12), DATE(9), NYN(3), NAM(17)(7)
      STRING   ENOF(8), NAM2(3)(6), NCON(3,12)(3), PRNDATE(9)
C:
      DATA   NAM/'POP','ADJ-POP','BTL CAS','KIA','WIA','BIL LOS','KIA','WIA'
               ,'EVAC','HOSP','DNBI','EVAC','HOSP','DOW','RTD','PATS','REPLS'/
      DATA   NBZZ/13/
C:
    2 FORMAT(/12X,14('________'))
    3 FORMAT(/12X,14('________'),$)
    4 FORMAT(12X,14('--------'))
    8 FORMAT(/4X,'*REPLACEMENT DELAY = ',I3,' DAYS'/6X,'EVACUATION'
        ,' DELAY:  WIA = ',I3,' DAYS'/24X,'DNBI = ',I3,' DAYS')
   10 FORMAT(///4X,$9,2X,$12,9X,$36,8X,$8//)
   20 FORMAT(/12X,14(2X,A6))
   22 FORMAT(/4X,$7,1X,14I8)
   24 FORMAT(7X,$4,1X,14I8)
C:
        NPD = 26
      DO 202  N=1,NPD
  202   NDX(N) = N
C:      NPD = 14
C:    DO 202  N=1,NPD
C:    IF (N.LT.12)   NDX(N) = N
C:    IF (N.GT.11)   NDX(N) = N + 2*(N-11)
C:202 CONTINUE
C:      NPD = 25
C:    DO 202  N=1,NPD
C:202   NDX(N) = N
      IF (NFIL.EQ.0)   GO TO 204
      IF (NCON(3,IDO(NFIL,2)).EQ.'S')   GO TO 220
  204   NYN = 'N';   IF (NFIL.EQ.0)  ACCEPT "    STANDARD PRINT ? ", NYN
      IF (NYN.EQ.'Y')  GO TO 220
      ACCEPT "    # OF PERIODS TO PRINT = ", NPD;          NPD = NPD + 1
      ACCEPT "    LIST PERIOD(S): ", (NDYS(N), N=2,NPD);  NDX(1) = 1
      DO 212  N=2,NPD
  212   NDX(N) = 2 + NDYS(N)/10
  220 IF (NSW.GT.3)   GO TO 600
C:
C:          SOUISH THEATER/SUMMARY
        I = 1
      DO 398  N=2,NPD
        I = I + 1;      IF (I.EQ.NDX(N))   GO TO 398
        II = NDX(N) - 1
      DO 378  I=I,II
      DO 368  J=3,15
      IF (J.EQ.4.AND.MOD(NSW,2).EQ.1)   GO TO 368
        POUT(NDX(N),J) = POUT(NDX(N),J) + POUT(I,J)
```

```
  368 CONTINUE
        POUT(NDX(N),17) = POUT(NDX(N),17) + POUT(I,17)
  378 CONTINUE
        I = NDX(N)
  398 CONTINUE
C:
C:            PRINT THEATER/SUMMARY
        NT = 0;      IF (MOD(NSW,2).GT.0)   GO TO 404
        NAM(3) = 'BTL CAS';  NAM(8) = 'WIA';  NAM(12) = 'EVAC'
        NAM(13) = 'HOSP';    NAM(14) = 'DOW';   GO TO 410
  404   NAM(3) = 'DNBI';   NAM(8) = 'WIA-TR';   NAM(12) = 'TR'
        NAM(13) = 'OTHR';  NAM(14) = 'DOW-DIS'
  410   NB = NT + 1;          NT = MIN (NB+NBZZ,NPD)
      WRITE (1,10)  PRNDATE, THID, THETR, ENOF
      WRITE (1,20) (DAY(NDX(N)), N=NB,NT);      K = 0
      DO 428  J=1,17
      IF (J.EQ.7.OR.J.EQ.17)     WRITE (1,2)
        JA = 0
      IF (MOD(NSW,2).EQ.0)   GO TO 412
      IF (J.EQ.1)  JA = 3
      IF (J.LT.11)  GO TO (422,422,422,428,428,428,428,422,428,428),  J
      IF (J.GT.10)  GO TO (422,424,424,422,422,422,422),  J-10
  412 IF (J.EQ.11)     K = 3
      GO TO (422,422,422,424,424,428,422,422,424,424,422,422,422,422),  J-K
  422 WRITE (1,22)  NAM(J), (POUT(NDX(N),J+JA), N=NB,NT);     GO TO 428
  424 WRITE (1,24)  NAM(J), (POUT(NDX(N),J), N=NB,NT)
  428 CONTINUE
      DO 432  N=NB,NT
      IF (N.GT.1)   POUT(NDX(N),17) = POUT(NDX(N),17) + POUT(NDX(N-1),17)
  432 CONTINUE
      WRITE (1,22)  'CUM-REP', (POUT(NDX(N),17), N=NB,NT)
C:    WRITE (1,22)  ' EVACS ', ((POUT(NDX(N),9)+POUT(NDX(N),12)), N=NB,NT)
      IF (NSW.EQ.0)   WRITE (1,8)  10*IDLY, MDW, MDD
      WRITE (1,2);     DISPLAY CHAR(108);   IF (NT.LT.NPD)    GO TO 410
      RETURN
C:
C:            SQUISH/PRINT HOSPITAL DATA
  600   I = 1
      DO 618  N=2,NPD
        I = I + 1;      IF (I.EQ.NDX(N))   GO TO 618
        II = NDX(N) - 1
      DO 612  I=I,II
      DO 612  J=1,3
  612   POUT(NDX(N),J) = POUT(NDX(N),J) + POUT(I,J)
  618   I = NDX(N)
        NT = 0;      WRITE (1,10)  PRNDATE, THID, THETR, ENOF
        NAM2(1) = 'WIA';   NAM2(2) = 'DNBI';   NAM2(3) = 'DOW'
  630   NB = NT + 1; NT = MIN(NB+NBZZ,NPD);  WRITE (1,20) (DAY(NDX(N)), N=NB,NT)
      DO 638  J=1,3
  638 WRITE (1,22)  NAM2(J), (POUT(NDX(N),J), N=NB,NT)
      IF (NT.GE.NPD)   GO TO 650
      DISPLAY " ";   DISPLAY " ";   GO TO 630
  650 WRITE (1,2);     WRITE (1,4);     DISPLAY CHAR(108);     RETURN
      END
```

MMMHOSPRG

Function

Produces peak medical staff requirements, by time period, by staff designation (doctors, nurses, corpsmen), for WIA/NBI patients and for DISEASED patients.

Input

- WIA, DNBI, POW & DISCHARGE data extracted from casualty tables and stored in hospital data file(s) by MMMPRNPRG. Any combination of files and data sets within files may be pooled for processing
- A policy file produced by NUPOLPRG appropriate for the particular casualty sources. This is usually, but not necessarily, the same theater or non-theater policy file used by the casualty program (MMMCASPRG)
- Designation of the rate of admissions in any specified time period. i.e., 10% per day, 40% on day 4 and 60% on day 5, etc.

Output

- A medical requirements file containing tables of peak staff requirements for WIA/NBI patients and DISEASED patients by time period
- Printed versions of each table produced

Use

- Input to printing program (MEDPRN)
- Input to the demand program (MMMDEMPRG)

```
C:     MMMHOSPRG    ESTIMATES MEDICAL REQ'MNTS, CREATES MED REQ FILE
C:
       STRING       DAY(27)(6), THETR(36), IFN(15), MFN(15), PFN(15), NYN(3)
       STRING       TYP(2)(8), THID(12), FILID(15), DATE(9), RUNDATE(9), ENGF(8)
       STRING       ECHORG(8)
       DIMENSION    MDL(2), IDO(15), INLST(15), MDA(2)
       DIMENSION    WIA(26), DNB(26), DOW(26), WIAX(26), DNBX(26), DOWX(26)
       DIMENSION    PDP(270), MPOL(26), IRTD(3,2), RWDV(3,2), HWW(2), HDW(2)
       DIMENSION    AEV(26,2), EVX(26,2,3), RVX(2,3)
       DIMENSION    JB(8), JT(8), KB(8)
       DIMENSION    FHP(7,2), FHN(6,2), FHC(6,2), RCUP(3,2), FHPX(3,2)
       DIMENSION    FNP(5,2), FNN(5,2), FNC(5,2), FNPX(3), LPNC(5)
C:
       DIMENSION    HSP(26), PAT(26), WHP(26), WHN(26), WHC(26)
       DIMENSION    ADP(270), ADN(270), ADC(270), PFP(270), PRT(500), PDW(5)
C:
       DATA    DAY/'PRE-M'
              ,'M','M+10','M+20','M+30','M+40','M+50','M+60','M+70','M+80
              ,'M+90','M+100','M+110','M+120','M+130','M+140','M+150','M+160'
              ,'M+170','M+180','M+190','M+200','M+210','M+220','M+230','M+240'/
       DATA    DAY(27)/'M+250'/
       DATA    FHP/1.196, 5*.107, 0,  .114, 5*.04, 0/
       DATA    RCUP/.04,.05,.06, .017,.022,.022/
       DATA    FHPX/.02,.01,0,  .01,.005,0/
       DATA    FHN/.908,.368,.338,.338,.334,.312, .242,.242,.229,.229,.209,.184/
       DATA    FHC/1.89,.503,.465,.465,.458,.426, .321,.321,.301,.301,.272,.234/
C:
       DATA    FNP/.33,.074,0,0,.015, .210,.038,.038,.016,.016/
       DATA    FNPX/.056,.059,.061/
       DATA    FNN/.595,.495,.242,.242,.202, .302,.280,.204,.204,.195/
       DATA    FNC/.827,.693,.302,.302,.236, .386,.354,.241,.241,.227/
C:
       DATA    HWW/1.0,0.0/, HDW/0.2,.8/, PDW/.6,.7,.8,.9,1.0/
       DATA    ILM/26/,  LPNC/1,10,15,50,270/
       DATA    TYP/'WIA\NBI','DISEASED'/
C:
     2 FORMAT(/14X,8('________'))
     4 FORMAT(14X,8('--------'))
     6 FORMAT(///)
     7 FORMAT(15X,S12,2X,A9)
    10 FORMAT(///8X,A36,22X,S12//34X,S8)
    12 FORMAT(/I5,2X,S36,1X,S8,2X,S12,2X,A6)
    20 FORMAT(/12X,'ADMISSIONS',4X,'PATIENTS',5X,'DOCTORS',6X,'NURSES'
                  ,4X,'CORPSMEN'/28X,'PEAK'/)
    22 FORMAT(4X,A6,5I12)
C:
       WRITE (1,6);      ACCEPT "  RUN DATE = ", RUNDATE
   100 ACCEPT "  MEDICAL REQ'MNTS FILE = ",MFN, "     ID = ", FILID
       OPEN (4,MFN,OUTPUT,BINARY)
       ACCEPT "    ADD-ON ? ", NYN;    IF (NYN.EQ.'N')  WRITE (4)  FILID, RUNDATE
C:
       ACCEPT "  POLICY FILE = ", PFN;    OPEN (3,PFN,INPUT,BINARY)
       READ (3)  JSW, JNUM, MPOL, RWDV, IRTD
         JB(1) = 0
       DO 122  J=1,JNUM
       READ (3)  KB(J), JT(J), (PRT(K+JB(J)), K=1,JT(J))
   122   JB(J+1) = JT(J) + JB(J)
       CLOSE (3)
C:
```

```
      ACCEPT "  RUN THRU DAY M+", NTT
      DISPLAY " ";      DISPLAY "    ENTER ADM RATES: ";    NT = -10
  130   NN = NT + 1;    DISPLAY "       FROM", NN
      ACCEPT "         TO ", NT," = ", PDPCT
      DO 132  M=NN+10,NT+10
  132   PDP(M) = PDPCT
      IF (NT.LT.NTT)      GO TO 130
        ITPX = NTT/10 + 1
      ACCEPT "       EVAC DELAY:   WIA\NBI = ", MDL(1), " DIS = ", MDL(2)
C:
      WRITE (1,2);      NCNT = 0;       NFCNT = 0
  180 ACCEPT "  HOSPITAL FILE = ", MFN;   OPEN (7,MFN,RANDIN (189),BINARY)
  190 ACCEPT "    # OF RECORDS TO PROCESS = ", NUMR
      ACCEPT "    REC'D #S = ", (INLST(N), N=1,NUMR);      NREC = 0
C:
  200   NREC = NREC + 1
      READ (7)(INLST(NREC)) ISW, DATE, THID, THETR, ENOF, ITP, NF1,NF2,NF3
              ,XNF, WIAX, XNF, DNBX, XNF, DOWX;     ISW = MOD(ISW,2)
      IF (ISW.NE.JSW)   GO TO 200
        NCNT = NCNT + 1;       NFCNT = NFCNT + NF2
      WRITE (1,12) INLST(NREC), THETR, ENOF, THID, DAY(ITP+1)
      DO 218  I=1,ITP
        WIA(I) = WIA(I) + WIAX(I)
        DNB(I) = DNB(I) + DNBX(I)
  218   DOW(I) = DOW(I) + DOWX(I)
      IF (NREC.LT.NUMR)   GO TO 200
      CLOSE (7)
      ACCEPT "    ANOTHER HOSPITAL FILE ?",NYN;   IF (NYN.EQ.'N')  GO TO 240
      DO 222  N=1,15
  222   INLST(N) = 0
      GO TO 180
  240 DISPLAY " ", NCNT, "   REC'DS USED";      WRITE (1,2)
C:      IX = ICH
C:150 DISPLAY "       EVAC TO ECH ", IX+1
C:    ACCEPT "       %WIA\NBI = ", RVX(IX,1), "       %DIS = ", RVX(IX,2)
C:      IX = IX + 1;      IF (IX.LE.3)   GO TO 150
C:
C:    ACCEPT "   EVACUEE FILE FOR OTHER ECHELONS = ", IFN
C:    OPEN (3,IFN,OUTPUT,BINARY)
C:
      ACCEPT "  MEDICAL TABLE THEATER = ", THETR, "    ID = ", THID
C:
        IW = 0;      ITP = ITPX;      ISWI = 1 - ISW
  400   IW = IW + 1;     MEV = MDL(IW);     IIA = 0;    KDOMAX = 0;    MAV = MDA(IW)
      DO 408  I=1,ILM
         WHP(I) = 0;    WHN(I) = 0;    WHC(I) = 0;    PAT(I) = 0
  408 CONTINUE
      DO 498  I=1,ITP
        IB = 10*(I-1);              PDPX = 0;      HS21 = 0
        FHP(7,IW) = RCUP(MPOL(I),IW)
        FNP(3,1) = FNPX(MPOL(I));      FNP(4,1) = FNP(3,1)
        HSP(I) = HWW(IW)*WIA(I) + HDW(IW)*DNB(I)
        EVT = RWDV(MPOL(I),IW)*HSP(I)
        JJ = IRTD(MPOL(I),IW);      KFR = JB(JJ) + 1
        KBGN = KB(JJ)-1;            KTOP = KBGN + JT(JJ) - 1
        KDO  = MIN(KTOP,10*ILM-IB);    KLM = MIN(21,KDO)
        KDOMAX = MAX (KDO+10,KDOMAX);    KDOMAX = MIN (KDOMAX,10*ILM-IB)
C:    DO 412  IX = ICH,3
C:412   EVX(I,IW,IX) = EVT*RVX(IW,IX)
C:
      DO 458  N=1,10
```

```
        NN = IB + N
        ADM = PDP(NN) * HSP(I);    EVN = PDP(NN) * EVT
        DWN = PDP(NN) * DOW(I);    RTN = ADM - DWN - ISWI*EVN
C:      AEN = PDP(NN) * AEV(I,IW)
        FEV = 0:      KX = 1;      FEVA = 0
      DO 438  K=1,KLM
        KK = MAX( 0,K-KBGN);       IF (K.GT.MEV)  FEV = 1.0
C:    IF (K.GT.MAV)  FEVA = 1.0
C:      HSX = FEVA*AEN:      RTN = RTN + HSX
        HSS = ADM - FDW(MIN(K,5))*DWN - FRT(KFR+KK)*RTN - ISWI*FEV*EVN + HSX
      IF (HSS.LE.0)    GO TO 440
        L = N - 1 + K;       PEP(L) = PEP(L) + HSS
      IF (L.EQ.21)  HS21 = HS21 + HSS
      IF (ISW.EQ.0)    GO TO 430
      IF (K.GT.LPNC(KX))  KX = KX + 1
        ADP(L) = ADP(L) + FNP(KX,IW) * HSS
        ADN(L) = ADN(L) + FNN(KX,IW) * HSS
        ADC(L) = ADC(L) + FNC(KX,IW) * HSS;      GO TO 434
  430   ADP(L) = ADP(L) + FHP(MIN(K,7),IW)*HSS
C:      ADP(L) = ADP(L) + FHPX(MIN(MAX(K-MAV,1),3),IW)*HSX
        ADN(L) = ADN(L) + FHN(MIN(K,6),IW)*HSS
        ADC(L) = ADC(L) + FHC(MIN(K,6),IW)*HSS
  434 IF (L.GE.KLM)    GO TO 440
  438 CONTINUE
  440   WHP(I) = MAX(WHP(I),ADP(N));    WHN(I) = MAX(WHN(I),ADN(N))
        WHC(I) = MAX(WHC(I),ADC(N));    PAT(I) = MAX(PAT(I),PEP(N))
        PDPX = MAX (PDPX,PDP(NN))
  458 CONTINUE
C:
      IF (KDO.LE.21)    GO TO 480
        KX = 4
      DO 478  L=31,KDO+10,10
        KK = MAX (0,L-10-KBGN)
        HS21 = HS21 - FRT(KFR+KK)*RTN/PDPX
      IF (HS21.LE.0)    GO TO 480
        PEP(L) = PEP(L) + HS21
      IF (ISW.EQ.0)    GO TO 470
      IF (L.GT.50)     KX = 5
        ADP(L) = ADP(L) + HS21*FNP(KX,IW)
        ADN(L) = ADN(L) + HS21*FNN(KX,IW)
        ADC(L) = ADC(L) + HS21*FNC(KX,IW);      GO TO 478
  470   ADP(L) = ADP(L) + HS21*FHP(7,IW)
        ADN(L) = ADN(L) + HS21*FHN(6,IW)
        ADC(L) = ADC(L) + HS21*FHC(6,IW)
  478 CONTINUE
  480 DO 482  L=1,31
        PEP(L) = PEP(L+10);    ADP(L) = ADP(L+10);    ADN(L) = ADN(L+10)
  482   ADC(L) = ADC(L+10)
      DO 486  L=41,KDOMAX+10,10
        PEP(L) = PEP(L+10);    ADP(L) = ADP(L+10);    ADN(L) = ADN(L+10)
  486   ADC(L) = ADC(L+10)
      IF (I.LT.ITP)  GO TO 498
      IF (IIA.EQ.0)    IADD = MIN ( 1+KDOMAX/10, ILM-ITP )
      IF (IIA.GE.IADD)    GO TO 498
        IIA = IIA + 1
      DO 492  N=1,10
       WHP(I+IIA) = MAX(WHP(I+IIA),ADP(N)); WHN(I+IIA) = MAX(WHN(I+IIA),ADN(N))
       WHC(I+IIA) = MAX(WHC(I+IIA),ADC(N)); PAT(I+IIA) = MAX(PAT(I+IIA),PEP(N))
  492 CONTINUE
      GO TO 480
C:
```

```
  498 CONTINUE
C:
      ACCEPT "?",NYN:   WRITE (1,10)  THETR, THID, TYP(IW);      WRITE (1,20)
      DO 518  I=1,ITP+IADD
  518 WRITE (1,22)  DAY(I+1), HSP(I), PAT(I), WHP(I), WHN(I), WHC(I)
      WRITE (1,2);      WRITE (1,4);      ACCEPT "?", NYN
      WRITE (4)  100+ISW, RUNDATE, THID, THETR, TYP(IW), ITP, IW,NFCNT, 0
      WRITE (4)  ZER,HSP, ZER,PAT, ZER,WHP, ZER,WHN, ZER,WHC
      DO 522  L=1,270
        ADP (L) = 0;      ADN(L) = 0;      ADC(L) = 0
  522   PEP (L) = 0
      IF (IW.EQ.1)   GO TO 400
      CLOSE (7);      NCNT = 0
      ACCEPT "  ANOTHER MEDICAL TABLE ? ", NYN;   IF (NYN.EQ.'N')  GO TO 900
      DO 532  I=1,ILM
        WIA(I) = 0;      DNB(I) = 0
  532   DOW(I) = 0
      GO TO 180
  900 CLOSE(4);      WRITE (1,4)
      END
```

MEDPRN

Function

Aggregates medical requirements tables and tallies enlisted, officer and total requirements.

Input

- Medical requirements files generated by the medical requirements program (MMMHOSPRG). Any data sets from any files may be pooled for processing.

Output

- Printed tables of peak medical staff requirements by staff type, enlisted, officers and totals, by time period

```
      STRING      DAY(27)(6), THETR(36), ENOF(8), THID(12), DATE(9)
      STRING      MFN(15), FILID(15), FILDATE(9), RUNDATE(9), NYN(3)
      STRING      NAM(14)(9), ENOFL(8), TYP(3)(8), RNID(12), TYPA(8)
      DIMENSION    NDX(27), NDYS(27), PINP(27,17), PMED(27,5)
      DIMENSION    PCD(27), DEM(27,3), DNS(27,2), DTE(27), PNS(27)
      DIMENSION    AMED(27,5), DMED(27,2), IDO(12)
C:
      DATA    DAY/'PRE-M','M'
             ,'M+10','M+20','M+30','M+40','M+50','M+60','M+70','M+80','M+90'
             ,'M+100','M+110','M+120','M+130','M+140','M+150','M+160','M+170'
             ,'M+180','M+190' /
      DATA   (DAY(I),I=22,27)/'M+200','M+210','M+220','M+230','M+240','M+250' /
      DATA    TYP/'WIA\NBI','DISEASED',WIA&DIS '/
      DATA    PCD/27*.10/, ILM/27/,    NBZZ/13/
C:
     1 FORMAT(//)
     2 FORMAT(/12X,6('________'),22X,6('______'))
     4 FORMAT(12X,6('--------'),22X,6('------'))
     7 FORMAT(15X,$12,2X,A9)
    10 FORMAT(///4X,$9,2X,$12,9X,$36,8X,$8//)
    12 FORMAT(/I5,$36,1X,$8,2X,$12,2X,A6)
    20 FORMAT(/12X,'ADMISSIONS',4X,'PATIENTS',5X,'DOCTORS',6X,'NURSES'
           ,4X,'CORPSMEN',22X,'OFFICERS    ENLISTED',7X,'TOTAL'/28X,'PEAK'/)
    22 FORMAT(4X,A6,5I12,18X,3I12)
    30 FORMAT(/14X,'OFFICERS',4X,'ENLISTED',7X,'TOTAL'/)
    14 FORMAT(8X,I4,' RECS USED'/)
C:
      WRITE (1,1);     ACCEPT " RUN DATE = ", RUNDATE, "     "
C:
   200   LIW = -1;      ACCEPT " MEDICAL FILE = ", MFN
      OPEN (7,MFN,INPUT,BINARY);              NFIL = 0
      READ (7) FILID, FILDATE;                WRITE (1,7) FILID,FILDATE
      CALL GETDO (IDO,NUMR);                  NUMR = NUMR + NRECH
   210 READ (7,END=250)  ISW,DATE,THID,THETR,TYPA,ITP,IW,NF1,NF2,PMED
        NFIL = NFIL + 1;          IF (IDO(NFIL).EQ.0)  GO TO 210
      WRITE (1,12)  NFIL,THETR, TYPA, THID, DAY(ITP+1)
      NRECH = NRECH + 1;          KSW = MOD(ISW,2)
      IF (LIW.LT.0)   LIW = IW
      IF (IW.NE.LIW)  LIW = 3
C:
      DO 238  I=1,ILM
        DMED(I,1) = DMED(I,1) + PMED(I,3) + PMED(I,4)
        DMED(I,2) = DMED(I,2) + PMED(I,5)
      DO 238  K=1,5
        AMED(I,K) = AMED(I,K) + PMED(I,K)
   238 CONTINUE
        ITPX = MAX (ITPX,ITP);    IF (NRECH.LT.NUMR)  GO TO 210
   250 CLOSE (7);      ACCEPT "        ANOTHER MEDICAL FILE ? ", NYN
      IF (NYN.EQ.'Y')   GO TO 200
      WRITE (1,14)  NRECH;      WRITE (1,2)
C:
      ACCEPT "  MEDICAL TABLE THEATER = ", THETR, "     ID = ", THID
      DISPLAY CHAR(108)
      WRITE (1,10) RUNDATE, THID, THETR, TYP(LIW);    WRITE (1,20)
      DO 518  I=2,ILM
   518 WRITE (1,22)  DAY(I), (AMED(I,K), K=1,5), (DMED(I,K), K=1,2)
                    ,(DMED(I,1)+DMED(I,2))
```

```
C:     WRITE (1,2)
C:     WRITE (1,10) RUNDATE, THID, THETRD, TYP(LIW);   WRITE (1,30)
C:     DO 522  I=2,ILM
C:522 WRITE (1,22)  DAY(I), (DMED(I,K), K=1,2), (DMED(I,1)+DMED(I,2))
      WRITE (1,2);     WRITE (1,4);     DISPLAY CHAR(108)
      DO 532  K=1,5
      DO 532  I=2,ILM
      IF (K.LT.3)  DMED(I,K) = 0
  532   AMED(I,K) = 0
      CLOSE (7);      NCNT = 0
      ACCEPT "  ANOTHER MEDICAL TABLE ? ", NYN;   IF (NYN.EQ.'Y')  GO TO 200
  900 CLOSE(4);      WRITE (1,4)
      END

      SUBROUTINE GETDO (IDO,NUMR)
      DIMENSION   IDO(*), INLST(12)
      DO 112  N=1,12
  112   IDO(N) = 0
      ACCEPT "     # OF RECORDS TO PROCESS = ", NUMR
      ACCEPT "     RECORD #S = ", (INLST(N), N=1,NUMR)
      DO 122  N=1,NUMR
  122   IDO(INLST(N)) = 1
      RETURN
      END
```

MMMDEMPRG

Function

This program produces detailed demand tables.

Input

- Casualty data sets from either MMMCASPRG or MMMPRNPRG
- Medical requirements data sets from MMMHOSPRG
- Non-structure input as one of the following:
    1) %, by time period, of non-theater structure
    2) personnel by time period

Output

- A demand file containing each demand table created
- A printout, by time period, for each demand table

Use

The demand file is an input for the demand-suply comparison program (MMMDSMODL)

Options

- Both casualty data sets and medical data sets are individually selected for use in creating each demand table. This allows flexibility in determining the cross-sections represented in each demand table; i.e., for officers or enlisted, for subset theaters(s), total theater, etc.
- Table printouts are optional, and the time periods for which data is printed may also be specified

```
C:          MMMDEMPRG    DEMAND MODEL
C:
      STRING      DAY(27)(6), THETR(36), ENOF(8), THID(12), DATE(9)
      STRING      MFN(15), FILID(15), FILDATE(9), RUNDATE(9), NYN(3)
      STRING      NAM(14)(9), ENOFL(8), TYP(8),  DTHETR(36), RNID(12)
      STRING      RORP(2)(9)
      DIMENSION    NDX(27), NDYS(27), PINP(27,17), PMED(27,5)
      DIMENSION    PCD(27), DEM(27,3), DNS(27,2), DTE(27), PNS(27)
      DIMENSION    DOUT(27,14), DMED(27,2), IDO(12)
C:
      EQUIVALENCE (DEM,DOUT), (DNS,DOUT(1,8)), (DTE,DOUT(1,14))
C:
      DATA    DAY/'PRE-M','M'
             ,'M+10','M+20','M+30','M+40','M+50','M+60','M+70','M+80','M+90'
             ,'M+100','M+110','M+120','M+130','M+140','M+150','M+160','M+170'
             ,'M+180','M+190' /
      DATA    DAY(22)/'M+200','M+210','M+220','M+230','M+240','M+250' /
      DATA    NAM/'DEMAND','TRAINED','STRUCTURE','THEATER','NON-THETR'
                 ,'MEDICAL','BIL LOS','NON-STRUC','CAS-REPLS','KIA','WIA'
                 ,'DNBI','RTDS','TRAINEES'/
      DATA    RORP/'RATES ','PERSONNEL '/
      DATA    PCD/27*.10/, ILM/27/,    NBZZ/13/
C:
     1 FORMAT(//)
     2 FORMAT(6X,15('________')/)
     7 FORMAT(15X,S12,2X,A9)
     9 FORMAT(2X,S36,1X,A12,1X,S3,1X,A9,1X,A6)
    10 FORMAT(//2X,S9,2X,S12,3X,S8,2X,S36/)
    12 FORMAT(I5,2X,S36,2X,S8,2X,S12,A6)
    14 FORMAT(8X,I4,' RECS USED'/)
    16 FORMAT(7X,'ANOTHER ',A8,%)
    18 FORMAT(6X,'ENTER ',S9,' PRE-M = '%)
    19 FORMAT(6X,'FROM M+',S4,%)
    20 FORMAT(/14X,14(2X,A6))
    62 FORMAT(//2X,S9,3X,14I8)
    64 FORMAT(/4X,S9,1X,14I8)
    66 FORMAT(6X,S8,14I8)
C:
      WRITE (1,1)
      ACCEPT " RUN DATE = ", RUNDATE, "     ID = ", FILID, "     "
      ACCEPT " RUN THRU DAY M+", NTT;      DISPLAY " ";    WRITE (1,2)
        ITPX = NTT/10 + 1
      ACCEPT " DEMAND FILE = ", MFN,"     ";    OPEN (4,MFN,OUTPUT,BINARY)
      WRITE (4)  FILID, RUNDATE;  WRITE (1,2)
        RNID = FILID
  110 DO 112  I=1,27
        PNS(I) = 0
  112   PCD(I) = 0
      ACCEPT " NON-STRUCTURE INPUT ? ", NYN, "     "
      IF (NYN.EQ.'N')    GO TO 130
        IRORP = 1;    ACCEPT " RATE ? ",NYN, "     "
      IF (NYN.EQ.'N')  IRORP = 2
      WRITE (1,18)  RORP(IRORP);      ACCEPT PCDIN
      IF (IRORP.EQ.1)  PCD(1) = PCDIN
      IF (IRORP.EQ.2)  PNS(1) = PCDIN
        NN = -10;       GO TO 122
  120   NN = NT + 1;       WRITE (1,19)  STR(NN)
  122 ACCEPT "          TO M+",NT, " = ", PCDIN
      DO 126  M=NN/10+3,NT/10+2
```

```
      IF (IRORP.EQ.1)  PCD(M) = PCDIN
      IF (IRORP.EQ.2)  PNS(M) = PCDIN
  126 CONTINUE
      IF (NT.LT.NTT)      GO TO 120
C:
  130 DO 134  I=1,27
      DO 132  J=1,14
  132   DOUT(I,J) = 0
        DMED(I,1) = 0;      DMED(I,2) = 0
  134   DOUT(I,8) = PNS(I)
        NREC = 0;      NSW = -1
C:
  140 DISPLAY " "
      ACCEPT " CASUALTY FILE = ", MFN; OPEN (7,MFN,INPUT,BINARY)
      READ (7)  FILID, FILDATE;          WRITE (1,7)  FILID, FILDATE
      CALL GETDO(IDO,NUMR);              NUMR = NUMR + NREC
        NFIL = 0;    ENDFL = ' '
C:
  150 READ (7,END=190)  ISW,DATE,THID,THETR,ENOF,ITP,M,M,M,PINP
        NFIL = NFIL + 1;      IF (IDO(NFIL).EQ.0)  GO TO 150
      IF (ENDFL.EQ.' ')  ENDFL = ENOF
      IF (ENOF.NE.ENDFL)  GO TO 150
      WRITE (1,12)  NFIL, THETR, ENOF, THID, DAY(ITP+1)
        NREC = NREC + 1;      KSW = MOD (ISW,2)
      IF (NSW.LT.0)    NSW = KSW
      IF (KSW.NE.NSW) NSW = 2
      DO 168  I=1,ITP+1
        DOUT(I,11) = DOUT(I,11) + PINP(I,8)
        DOUT(I,12) = DOUT(I,12) + PINP(I,11)
        DOUT(I,13) = DOUT(I,13) - PINP(I,15)
      IF (KSW.EQ.1)    GO TO 164
C:      DOUT(I,8) = DOUT(I,8) + PCD(I)*PINP(I,1)
        DOUT(I,4) = DOUT(I,4) + PINP(I,1)
        DOUT(I,10) = DOUT(I,10) + PINP(I,7)
        DOUT(I,7) = DOUT(I,7) - PINP(I,6)
      GO TO 168
  164   DOUT(I,5) = DOUT(I,5) + PINP(I,4)
        DOUT(I,8) = DOUT(I,8) + PCD(I)*PINP(I,4)
  168 CONTINUE
        IF (NREC.LT.NUMR)  GO TO 150
  190 CLOSE (7);    WRITE (1,16)  ENOF:    ACCEPT " CASUALTY FILE ? ", NYN
      IF (NYN.EQ.'Y')    GO TO 140
      WRITE (1,14) NREC;      NRECH = 0;    LIW = -1
C:
  200 ACCEPT " MEDICAL FILE = ", MFN:       IF (MFN.EQ.'N')  GO TO 320
      OPEN (7,MFN,INPUT,BINARY);            NFIL = 0
      READ (7) FILID, FILDATE;              WRITE (1,7) FILID,FILDATE
      CALL GETDO (IDO,NUMR);                NUMR = NUMR + NRECH
  210 READ (7,END=250)  ISW,DATE,THID,THETR,TYP,ITP,IW,NF1,NF2,PMED
        NFIL = NFIL + 1;          IF (IDO(NFIL).EQ.0)  GO TO 210
      WRITE (1,12)  NFIL,THETR, TYP, THID, DAY(ITP+1)
      NRECH = NRECH + 1;          KSW = MOD(ISW,2)
C:
      DO 238  I=1,ITP+1
      IF (KSW.EQ.1)    GO TO 230
      IF (ENOF.EQ.'ENLISTED')    GO TO 224
        DMED(I,1) = DMED(I,1) + PMED(I,3) + PMED(I,4);      GO TO 238
  224   DMED(I,1) = DMED(I,1) + PMED(I,5);    GO TO 238
  230 IF (ENOF.EQ.'ENLISTED')    GO TO 234
        DMED(I,2) = DMED(I,2) + PMED(I,3) + PMED(I,4);      GO TO 238
  234   DMED(I,2) = DMED(I,2) + PMED(I,5)
```

```
  238 CONTINUE
        ITPX = MAX (ITPX,ITP);    IF (NRECH.LT.NUMR)  GO TO 210
  250 CLOSE (7);      ACCEPT "        ANOTHER MEDICAL FILE ? ", NYN
      IF (NYN.EQ.'Y')    GO TO 200
      WRITE (1,14)  NRECH;      WRITE (1,2)
C:
  320 DO 358  I=1,ITPX+1
      IF (I.EQ.1)  GO TO 350
        DOUT(I,7) = DOUT(I,7) + DOUT(I-1,7)
      DO 338  J=10,13
  338   DOUT(I,J) = DOUT(I,J) + DOUT(I-1,J)
  350   DOUT(I,9) = DOUT(I,10)+DOUT(I,11) + DOUT(I,12)+DOUT(I,13)
        DOUT(I,4) = DOUT(I,4) - DOUT(I,7) - DMED(I,1)
        DOUT(I,5) = DOUT(I,5) - DMED(I,2)
        DOUT(I,6) = DMED(I,1) + DMED(I,2)
        DOUT(I,3) = DOUT(I,4) + DOUT(I,5) + DOUT(I,6) + DOUT(I,7)
        DOUT(I,2) = DOUT(I,3) + DOUT(I,8) + DOUT(I,9)
  358   DOUT(I,1) = DOUT(I,2) + DOUT(I,14)
C:
      ACCEPT "  DEMAND THEATER NAME = ", THETR
      WRITE (4)  200+NSW,RUNDATE,RNID,THETR,ENOF,ITPX,0,NREC,NRECH,DEM,DNS,DTE
        NPD = 14
      DO 402  N=1,NPD
      IF (N.LT.12)  NDX(N) = N
      IF (N.GT.11)  NDX(N) = N + 2*(N-11)
  402 CONTINUE
      ACCEPT "    PRINT DEMAND DETAIL ? ", NYN;    IF (NYN.EQ.'N')  GO TO 500
      ACCEPT "    STANDARD PRINT ? ", NYN;     IF (NYN.EQ.'Y')  GO TO 430
      ACCEPT "    # OF PERIODS TO PRINT = ", NPD;    NPD = NPD + 1
      ACCEPT "    LIST PERIOD(S): ", (NDYS(N), N=2,NPD);      NDX(1) = 1
      DO 412  N=2,NPD
  412   NDX(N) = 2 + NDYS(N)/10
  430 ACCEPT ".",NYN
        NT = 0
  450   NB = NT + 1;      NT = MIN(NB+NBZZ,NPD)
      WRITE (1,10)  RUNDATE, RNID, ENOF, THETR
      WRITE (1,20)  (DAY(NDX(N)), N=NB,NT)
      DO 468  J=1,14
      GO TO (462,462,464,466,466,466,466,464,464,466,466,466,466,468), J
  462 WRITE (1,62)  NAM(J), (DOUT(NDX(N),J), N=NB,NT);    GO TO 468
  464 WRITE (1,64)  NAM(J), (DOUT(NDX(N),J), N=NB,NT);    GO TO 468
  466 WRITE (1,66)  NAM(J), (DOUT(NDX(N),J), N=NB,NT)
  468 CONTINUE
      WRITE (1,1);      WRITE (1,2);      IF (NT.LT.NPD)    GO TO 450
      ACCEPT ".", NYN
  500 ACCEPT " ANOTHER DEMAND TABLE ? ", NYN;    IF (NYN.EQ.'Y')  GO TO 110
      CLOSE (4);      WRITE (1,2)
      END

      SUBROUTINE GETDO (IDO,NUMR)
      DIMENSION    IDO(*), INLST(12)
      DO 112  N=1,12
  112   IDO(N) = 0
      ACCEPT "    # OF RECORDS TO PROCESS = ", NUMR
      ACCEPT "    REC'D #S = ", (INLST(N), N=1,NUMR)
      DO 122  N=1,NUMR
  122   IDO(INLST(N)) = 1
      RETURN
      END
```

MMMDSMODL

Function

This program computes trainee demand as a function of trained demand shortfall and trainee supply, and displays a supply table, demand table, summary table, and demand-supply graphs.

Input

- Supply data sets created by the supply program (MMMSUPPRG)
- Demand data sets created by the demand program (MMMDEMPRG)

Output

- A supply table (cumulative), by time period
- A demand table (cumulative), by time period
- A summary table showing supply overages (shortages), by time period
- A graph of total demand and supply curves
- A graph of trained demand and supply curves

```
C:     MMMDSMODL    SUM,PRINT,COMPARE,GRAPH DEMAND-SUPPLY
C:
       COMMON       DAY, NPD, NDX(27), RNID, RDATE, ETYP, ENOF1, ENOF2
       STRING       DAY(27)(6), FILID(15), FILDATE(9), DATE(9), THID(12)
       STRING       THETR(36),  IFN(15), LFN(15), NYN(3), RNID(9), ENOF(8)
       STRING      ENOF1(8), ENOF2(8), ETYP(9), RDATE(9)
       DIMENSION   SINP(27,7), DINP(27,6), SUP(27), DEM(27), NDYS(27), IDO(12)
       DIMENSION   SOUT(27,7), DOUT(27,6), COUT(27,9), TRS(27), TRD(27)
C:
       EQUIVALENCE (DINP,SINP), (NDYS,SINP), (TRS,SOUT(1,2))
       EQUIVALENCE (SUP,SOUT), (DEM,DOUT),    (TRD,DOUT(1,2))
C:
       DATA    DAY/'PRE-M','M'
              ,'M+10','M+20','M+30','M+40','M+50','M+60','M+70','M+80','M+90'
              ,'M+100','M+110','M+120','M+130','M+140','M+150','M+160','M+170'
              ,'M+180','M+190','M+200','M+210','M+220','M+230','M+240'/
       DATA    DAY(27)/'M+240','M+250'/, ENOF1/' '/, ENOF2/' '/,   ILM/27/
C:
     2 FORMAT(////)
     4 FORMAT(/4X,12('______')//)
     7 FORMAT(15X,S12,2X,A9)
    12 FORMAT(I5,2X,S36,2X,S8,2X,S12,A6)
    16 FORMAT(I5,13H REC'DS READ/)
C:
         NPD = 14
       DO 102  N=1,NPD
       IF (N.LT.12)  NDX(N) = N
       IF (N.GT.11)  NDX(N) = N + 2*(N-11)
   102 CONTINUE
       WRITE (1,4);      ACCEPT " RUN DATE = ", RDATE, "     ID = ", RNID
       ACCEPT "   STANDARD PRINT ? ", NYN;      IF (NYN.EQ.'Y')  GO TO 130
       ACCEPT " # OF PERIODS TO PRINT = ", NPD;      NPD = NPD + 1
       ACCEPT " LIST PERIOD(S): ", (NDYS(N), N=2,NPD);      NDX(1) = 1
C:     ACCEPT " ENTER PRINT OPTIONS: ", IPRS, IPRD, IPRY, IGRY
       DO 122  N=2,NPD
   122   NDX(N) = 2 + NDYS(N)/10
   130   ITPY = NDX(NPD);      WRITE (1,4);      NREC = 0
C:
   200 ACCEPT " SUPPLY FILE = ", IFN;      IF (IFN.EQ.'N')   GO TO 300
       OPEN (3,IFN,INPUT,BINARY)
       READ (3)  FILID, FILDATE;   WRITE (1,7)  FILID, FILDATE
         NFIL = 0;      CALL GETDO(IDO,NUMR);      NUMR = NUMR + NREC
C:
   220 READ (3,END=290)  ISW, DATE, THID, THETR, ENOF, ITP, SINP
         NFIL = NFIL + 1;                    IF (IDO(NFIL).EQ.0)   GO TO 220
       WRITE (1,12)  NFIL, THETR, ENOF, THID, DAY(ITP+1);      NREC = NREC + 1
       DO 238  I=1,ITP+1
       DO 238  J=1,7
   238   SOUT(I,J) = SOUT(I,J) + SINP(I,J)
       IF (ENOF1.EQ.' ')  ENOF1 = ENOF
       IF (ENOF.EQ.ENOF1)   GO TO 240
       IF (ENOF2.EQ.' ')  ENOF2 = ENOF
     : IF (NREC.LT.NUMR)  GO TO 220

         F (3)
         T "     ANOTHER SUPPLY F"E ?", NYN:    IF (NYN.EQ.'Y')  GO TO 200
         (1,4)  NREC:      WRITE (1,4):      NREC = 0
```

```
C:
  300 ACCEPT " DEMAND FILE = ", LFN;      IF (LFN.EQ.'N')   GO TO 500
      OPEN (7,LFN,INPUT,BINARY)
      READ (7)  FILID, FILDATE;   WRITE (1,7)  FILID, FILDATE
        NFIL = 0;      CALL GETDO(IDO,NUMR);      NUMR = NUMR + NREC
C:
  320 READ (7,END=390)  ISW, DATE, THID, THETR, ENOF, ITP, NF,NF,NF, DINP
        NFIL = NFIL + 1;                    IF (IDO(NFIL).EQ.0)   GO TO 320
      WRITE (1,12)  NFIL, THETR, ENOF, THID, DAY(ITP+1);      NREC = NREC + 1
      DO 338  I=1,ITP+1
      DO 338  J=1,6
  338   DOUT(I,J) = DOUT(I,J) + DINP(I,J)
      IF (ENOF1.EQ.' ')  ENOF1 = ENOF
      IF (ENOF.EQ.ENOF1)   GO TO 340
      IF (ENOF2.EQ.' ')  ENOF2 = ENOF
  340 IF (NREC.LT.NUMR)  GO TO 320
C:
  390 CLOSE (7)
      ACCEPT "    ANOTHER DEMAND FILE ?", NYN:    IF (NYN.EQ.'Y')  GO TO 300
      WRITE (1,16)  NREC;      WRITE (1,4)
      DO 398  I=1,ITPX
        TEMP = 0
      IF (I+9.LE.ILM)  TEMP = MIN (0, ((SOUT(I+9,2)-DOUT(I+9,2))/.9) )
        DOUT(I,6) = SOUT(I,7) - TEMP
  398 DOUT(I,1) = DOUT(I,1) + DOUT(I,6)
C:
  400 DO 458  I=1,ITPX
        COUT(I,1) = SOUT(I,1);  COUT(I,2) = SOUT(I,2);  COUT(I,3) = SOUT(I,7)
        COUT(I,4) = DOUT(I,1);  COUT(I,5) = DOUT(I,2);   COUT(I,6) = DOUT(I,6)
        COUT(I,7) = SOUT(I,1) - DOUT(I,1)
        COUT(I,8) = SOUT(I,2) - DOUT(I,2)
  458   COUT(I,9) = COUT(I,3) - COUT(I,6)
C:
        ETYP = ENOF1;      IF (ENOF2.NE.' ')  ETYP = ETYP + '/'
  500 DISPLAY CHAR(108);    CALL DSPRNT (2,SOUT)
      WRITE (1,2);          CALL DSPRNT (1,DOUT)
      DISPLAY CHAR(108);    CALL DSPRNT (3,COUT)
      DISPLAY CHAR(108);    CALL DSGRPH (DEM,SUP)
      DISPLAY CHAR(108);    CALL DSGRPH (TRD,TRS);    DISPLAY CHAR(108)
      END


      SUBROUTINE GETDO (IDO,NUMR)
      DIMENSION    IDO(*), INLST(12)
      DO 112  N=1,12
  112   IDO(N) = 0
      ACCEPT "     # OF RECORDS TO PROCESS = ", NUMR
      ACCEPT "     REC'D #S = ", (INLST(N), N=1,NUMR)
      DO 122  N=1,NUMR
  122   IDO(INLST(N)) = 1
      RETURN
      END

      SUBROUTINE DSPRNT (NSW,FMAT)
      COMMON      DAY, NPD, NDX(27), RNID, RDATE, ETYP, ENOF1, ENOF2
      STRING      DAY(27)(6), RNID(9)
      STRING      WD0(3)(7), WD1(3)(9), WD2(4,2)(10)
      STRING      ENOF1(8), ENOF2(8), ETYP(9), RDATE(9)
      DIMENSION   FMAT(*,*)
C:
      DATA    WD0/'DEMAND','SUPPLY','SUMMARY'/
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      MMMDSMODL

      DATA    WD1/'TOTAL','TRAINED','TRAINEE'/
      DATA    WD2/'STRUCTURE','NON-STRUCT','CAS-REPLS',' ','INITIAL AF'
             ,'SELECT RES','OTHR INACT','TRAIN OUTP'/
      DATA    WD3/'INDIVID','KIA','WIA','DNBI','BIL LOSS',5HRTD'S/
      DATA    NBZZ/13/
C:
   10 FORMAT(/2X,S9,4X,S8,4X,S9,S8/48X,'* CUMULATIVE-',S8,'*')
   12 FORMAT(//14X,14(2X,A6))
   20 FORMAT(//2X,S9,3X,14I8)
   22 FORMAT(/4X,S7,4X,14I8)
   24 FORMAT(/6X,S10,14I8)
   26 FORMAT(//2X,'SHORT(OVER)'/2X,'TOTAL     ',3X,14I8)
C:
        NT = 0
  200   NB = NT + 1;          NT = MIN(NB+NBZZ,NPD);  WDO(3) = 'SUMMARY'
      WRITE (1,10)  RDATE, RNID, ETYP, ENOF2, WDO(NSW)
      WRITE (1,12)  (DAY(NDX(N)),N=NB,NT)
      GO TO (220,220,260), NSW
  220 WRITE (1,20)  WD1(1), (FMAT(NDX(N),1), N=NB,NT)
      WRITE (1,22)  WD1(2), (FMAT(NDX(N),2), N=NB,NT)
      DO 224  J=1,NSW+2
  224 WRITE (1,24)  WD2(J,NSW), (FMAT(NDX(N),J+2), N=NB,NT)
      WRITE (1,22)  WD1(3), (FMAT(NDX(N),NSW+5), N=NB,NT)
      GO TO 290
C:
  260   WDO(3) = 'TOTAL'
      DO 268  J=1,3
      IF (J.EQ.3)  GO TO 264
      WRITE (1,20)  WDO(3-J), (FMAT(NDX(N),3*J-2), N=NB,NT);   GO TO 266
  264 WRITE (1,26)  (FMAT(NDX(N),3*J-2), N=NB,NT)
  266 WRITE (1,22)  WD1(2), (FMAT(NDX(N),3*J-1), N=NB,NT)
  268 WRITE (1,22)  WD1(3), (FMAT(NDX(N),3*J), N=NB,NT)
C:
  290 IF (NT.LT.NPD)  GO TO 200
      END
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date

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      SUBROUTINE DSGRPH (DEM,SUP)
      COMMON     DAY, NPD, NDX(27), RNID, RDATE, ETYP, ENOF1, ENOF2
      STRING     DAY(27)(6), DY(27)(3), DY1(3)(3), SI(3), RNID(9), DID(2)(7)
      STRING     P1(21)(1), P2(21)(1), RDATE(9), ETYP(9), ENOF1(8), ENOF2(8)
      STRING     AFM(18), BFM(15), CFM(42), DFM(24), CFM3(42), CFM2(30)
      DIMENSION  DEM(*), SUP(*),  IDM(27), ISP(27), INC(10), KINT(10)
C:
      DATA   DY1/'PRE',' M ',' M+'/,  DY/' M ','DAY',' 10',' 20',' 30'
                ,' 40',' 50',' 60',' 70',' 80',' 90','100','110','120'
                ,'130','140','150','160','170','180','190','200','210'/
      DATA   LIM/26/, LENSET/115/, INC/1,2,5,10,20,25,40,50,100,200/
      DATA   KINT/5*5,4,4*5/, DID/' TOTAL ','TRAINED'/
C:
    2 FORMAT(////)
   10 FORMAT(1X,89,1X,89/1X,89,88,4X,'CUMULATIVE DEMAND AND SUPPLY',
             ' COMPARISONS',10X,87//3X,'MANPOWER'/4X,'(THOUS)'/)
C:
        NP = MIN(LIM,NPD);      DMX = 0;      SPX = 0;    IDID = IDID + 1
      DO 118  N=1,NP
        DMX = MAX (DMX,DEM(NDX(N)));        SPX = MAX (SPX,SUP(NDX(N)))
  118 CONTINUE
        DMX = DMX/1000;    SPX = SPX/1000;    DSX = MAX(DMX,SPX)
      DO 128  J=1,8
      IF (45*INC(J).GT.DSX)    GO TO 130
  128 CONTINUE
      STOP
  130   DIV = INC(J);    JC = J
      DO 138  N=1,NP
        IDM(N) = DEM(NDX(N))/(1000*DIV)
  138   ISP(N) = SUP(NDX(N))/(1000*DIV)
        LEN = LENSET/NP;      AFM = '(T11,' + STR(LEN*NP+1) + '(1H_),S1)'
        BFM = '(T' + STR(LEN*NP+12) + ',1HI)';      SI = STR (LEN-2-LEN/2)
        DFM = '(11X,' + SI + 'X,S3,' + STR(NP-1) + '(' + STR(LEN-3) + 'X,S3))'
         SI = STR (LEN-1-LEN/2)
        CFM2 = SI + 'X,A1,' + STR(NP-1) + '(' + STR(LEN-1) + 'X,A1,%))'
        CFM3 = '(T12,' + CFM2
      WRITE (1,10) RDATE,RNID,ETYP,ENOF2,DID(IDID);  WRITE (1,AFM) '_'
      DO 198  JJ=1,46
        K = 46-JJ
      DO 178  N=1,NP
        P1(N) = ' '
  178   P2(N) = ' '
      DO 188  N=1,NP
      IF (IDM(N).EQ.K)    P1(N) = 'D'
      IF (ISP(N).EQ.K)    P2(N) = 'S'
  188 CONTINUE
C:
      IF (MOD(K,KINT(JC)).GT.0)    GO TO 192
       CFM = '(5X,I4,2H_I,' + CFM2;  WRITE (1,CFM)  K*INC(JC), (P1(N), N=1,NP)
      WRITE (1,CFM3)  (P2(N), N=1,NP);       GO TO 194
  192   CFM = '(10X,1HI,' + CFM2
      WRITE (1,CFM)  (P1(N), N=1,NP);    WRITE (1,CFM3)  (P2(N), N=1,NP)
  194 IF (K.GT.0)  WRITE (1,BFM)
  198 CONTINUE
      WRITE (1,AFM) 'I';      WRITE (1,DFM)  (DY1(MIN(NDX(N),3)), N=1,NP)
      WRITE (1,DFM)  (DY(NDX(N)), N=1,NP)
      END
```


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